THE GARDEN JOURNAL

OF THE NEW YORK BOTANICAL GARDEN

Vol. 9, No. 2 March - April, 1959

March 20-April 20, 1959. Easter Show in the Conservatory of The New York Botanical Garden.

April 23-25, 1959. American Daffodil Society, Fourth Annual Meeting, Hotel Sylvania, Philadelphia.

May 5 and 12, 1959. City Gardens Club will hold its annual showing of gardens and penthouses in New York City, proceeds of which are for scholarships to New York City teachers to Audubon Nature Camp and for Natural Science teaching aids for classroom use.

May 14, 1959. Spring Garden Tour, lower Connecticut, sponsored by the Volunteer Associates of The New York Botanical Garden.

May 14, 1959. Board of Directors Meeting of American Horticultural Council at Longwood Gardens, Kennett Square, Pa., preceded by visit to Winterthur by invitation of Henry F. du Pont.

May 27, 1959. Annual Meeting of The New York Botanical Garden.

THE GARDEN JOURNAL
of The New York Botanical Garden
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DOROTHY EBEL HANSELL
Editor

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AMONG OUR CONTRIBUTORS

Helen S. (Mrs. Lewis M.) Hull is Acting Chairman of the Gardening Committee of the People-to-People Program. Well known in gardening circles from coast to coast, Mrs. Hull is a consulting editor for Flower Grower Magazine, author of Wild Flowers for Your Garden, past president of the American Horticultural Council, National Council of State Garden Clubs, Inc., and Garden Club of New Jersey.... For many years Mr. and Mrs. Raymond D. Wood have specialized in the photography of plants, covering the eastern seaboard to the Rocky Mountains. Their interest in alpines made them realize how valuable photographic studies of the flora of the North American Arctic would be, and for the past three years they have been working in the Canadian Arctic, with the cooperation of the Canadian government. Duplicate originals of their photographs of the plants of this area are deposited permanently in the National Museum of Canada. They are now making plans for their trip during the 1959 flowering season to Herschel Island in the Arctic Ocean just off the Yukon Coast and near the international boundary with Alaska. The flora of Herschel Island, an ice island, overlain with gravel and sediment, is quite different from other parts of the Canadian Arctic farther east. Eskimos and two Royal Canadian Mounted Police are the only inhabitants; the Woods will share the outpost of the two "Mounties."... Dr. Philip L. Rusden, Pathologist of the Bartlett Tree Research Laboratories since 1954, began applying specialized knowledge (research in cytology of higher fungi and mycology at Harvard Biological Laboratories) to shade trees when he served on the staff of Waltham, Massachusetts, Shade Tree Laboratory from 1951-1953. Prior to that, 1935-1950. Dr. Rusden was forest pathologist with the U.S.D.A., division of plant disease control in the Bureau of Entomology and Plant Quarantine. He combines research with thousands of miles of travel annually throughout the East, studying trees and their ills, probing, inquiring and finding the answers to preserve America's beautiful shade trees.... Dr. Robert Schery is a talented individual, a botanist who has served on the faculty of Washington University and the staff of the Missouri Botanical Garden, has published research and technical papers relating to plant taxonomy and books on elementary botany and economic botany, and has the gift of being able to translate his scientific knowledge into semi-popular and popular parlance for a diversity of publications including Nature, Natural History Magazine, Scientific American, House and Garden, Flower Grower Magazine, Horticulture. He is now finishing the text on The Lawnbook soon to be published by Macmillan Co. Dr. Schery has traveled extensively—and still does, in all states of the United States, in central and South America, and in Canada. Currently he and his family live in a house designed and built by themselves on a fifty-acre farm, "at least three acres of which are in reasonably good lawn." So he practises what he preaches as Director of the Lawn Institute located in Marysville, Ohio. ... Mary Ellen (Mrs. C. Ervin) Ross's interest in begonias began in her childhood in the greenhouses of her father, the late William D. Logee of Danielson, Connecticut. She was instrumental in starting the now famous begonia collection which her sister, Mrs. Joy Logee Martin, now continues. Mrs. Ross, who has a B.S. degree from Rhode Island University where she majored in horticulture, and her husband started Merry Gardens in Camden, Maine, in 1947. Merry Gardens is now known around the world not

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CREDIT FOR ILLUSTRATIONS

We are indebted to the Display Committee, Mrs. Charles Burlingham, Mrs. Richard S. Meredith, Mrs. Donald B. Straus, for the selection of the front cover illustration; pp. 43, 44, Raymond D. Wood, Mt. Kisco, N. Y.,; pp. 45, 46, Bartlett Tree Research Laboratories, Stamford, Conn.; pp. 47, 48, 49, Lawn Institute, Marysville, Ohio; pp. 50, 51, 52, Merry Gardens, Camden, Me.; pp. 53, 54, John Jeter, Dallas, Tex.; pp. 56, lower right 57, 58, 59, Biltmore Estate, lower left 56, Elliott Lyman Fisher, Asheville, N. C.; pp. 60, 61, 62, 63, T. H. Everett; pp. 65, 66, Walter Singer; p. 71, Jackson M. Batchelor, Willard, N. C.; sketches of **Symplocarpus foetidus**, p. 42, of **Arisaema triphyllum**, p. 68, by Charles Clare, Jr., botanical artist at The New York Botanical Garden.

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WORLD FRIENDSHIP — THROUGH GARDENING

By Helen S. Hull

"Nothing is more dangerous to our cause than to expect America's message to be heard if we don't bother to tell it."

—Dwight D. Eisenhower

TO ANYONE WHO SAYS America is disliked around the globe, we can reply that we have friends among gardeners in eighty-three countries, and hundreds of letters have been received from them to prove it. On March 15, the day of issue of the commemorative U. S. postage stamp honoring gardening and horticulture, the National Council of State Garden Clubs sent a letter of friendship and a packet of flower seed to five thousand gardeners throughout the world. Enclosed in the official cachet, and bearing the new gardening stamps, this letter was sent in cooperation with the People-to-People Program, initiated by President Eisenhower to promote world friendship and understanding through communication among people of common interests. The project was paid for through private donations to the People-to-People Program.

To obtain an adequate mailing list of overseas gardeners was an almost insurmountable problem. After vainly trying the U. S. Department of Agriculture, botanical gardens, and various arboretums, wholly by a chance circumstance, David Burpee heard of our search and offered to make his company's foreign mailing list available to us. Since the names included on that list were gardeners or at some time had ordered American seeds, a better one could not have been found. The W. Atlee Burpee Company also donated the packets of flower seed and provided invaluable assistance in addressing and mailing. Stamps, envelopes and the processing of the letter were paid for by other donations to the People-to-People Program.

The letter of friendship sent from the National Council headquarters and signed by the National Council president, Mrs. Daniel J. Mooney, explained that this was the first stamp in the United States or any country honoring gardening, and commemorating the one hundredth anniversary of America's revered horticulturist, Liberty Hyde Bailey, whose picture was on the first-day envelope. The letter suggested that this was a greeting from the gardeners of America in honor of the event, and if the recipient was a stamp collector as well as a gardener, we hoped he would want to add this first-day-of-issue letter to his stamp collection, or if not, that he might have a friend who would prize it. The packets of flower seed were selected varieties of petunias, snapdragons and marigolds, chosen for easy success in gardens of various conditions and climates.

The letter invited the recipient to write if he had any questions regarding gardening here in America. We explained about the National Council, that it was made up of more than twelve thousand garden clubs with five hundred thousand members and that there were more than one hundred other clubs and societies in the United States outside the government, like ourselves, comprising a million members. We wrote that we believed gardening had no national barriers, and that many gardeners in this country would like to know more of gardening abroad; that we believed with President Eisenhower that as people of like interests can know each other better, we can aid the cause of world peace, the desire of gardeners everywhere. If there were no specific gardening questions, but if they wanted to be put in touch with a gardener in this country with special plant interests similar to their own, we would be glad to do this.

More than seven hundred letters of appreciation and inquiry have been received from eighty-three different countries, including seven behind the Iron Curtain: Lithuania, Latvia, Bulgaria, Hungary, Poland, Czechoslovakia, East Germany (and Yugoslavia). Our replies to these letters have been sent in eight languages: French, Spanish, German, Polish, Portuguese, Italian, Swedish and English. In today's mail are offers to correspond in Lithuanian, Dutch, Norwegian and Japanese, all of which offers will be accepted for waiting letters. It has been our point of view that when our overseas friends have in many instances gone to great effort to write to us in English, we should make every effort to answer them in their language. It surprised us that this capability in so many languages was one of the latent talents of the Garden Club of New Jersey.

At the request of Mrs. Mooney, the Garden Club of New Jersey was asked to take charge of answering the letters, and almost a hundred members are engaged in this project. The many technical and scientific questions have received assistance from Dr. G. H. M. Lawrence, Director of the Bailey Hortorium, Cornell University, Dr. Milton Carleton, Dr. Samuel Emsweller and others where specific and scientific answers had to be found. More than one hundred letters were translated and made ready for answering by the Burpee Company. Because of the time lag in translating and answering, an air-mail postal of acknowledgement was sent by the National Council and a copy of FLOWER GROWER MAGAZINE, a gift of the publisher.

Many of the letters express amazement at receiving a "gift of value which asks nothing in return but friendship in the world", and this correspondent from Spain writes, "I will surely do everything I can to help in your aim." A plant explorer and dealer in rare plants of the Himalayas, living nine thousand feet up on the Indo-Tibeten border writes, "The service which you are rendering to the world gardeners and horticulturists is the greatest and the pioneer of the kind. Today the world needs such help to make progress itself and understand each others. I hope your country also others may require from me their needful. Myself require advice on gardening of your country." A German writes, "Gardening, thank God, has remained everywhere unpolitical and therefore idealistic and so competent to unite humanity beyond national frontiers." Moved by

our letter he offers to reciprocate by sending our members "a thousand or several thousand" packages of flower seed for our gardens. This offer of seeds has been accepted for distribution at the forthcoming National Council Convention in St. Louis in May. From every corner of the globe with the letters have come little gifts: photographs of their gardens and families — one showing our marigold seeds in bloom, stamps, seeds of faraway plants, and garden publications.

The kind of inquiry is varied. From Madras, India, came a request from residents there to obtain employment for a much respected young nurseryman in that country who longed to benefit from study of American nursery practices in California. Since he had too many degrees to qualify for a scholarship but could not bring any money out of India, although the U. S. I. S. would furnish transportation, he could not obtain an American visa without first securing employment. Happy to say, with the help of the Los Angeles Arboretum, we have been able to secure an offer of salaried employment from one of the largest nurseries in California, and the young nurseryman should soon arrive "for two season of work".

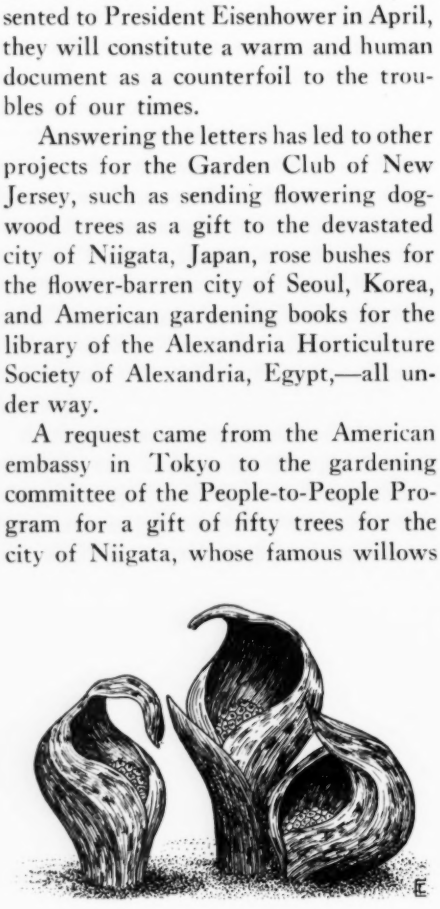
From South Africa a member of the Transvaal Horticulture Society requests information on the identification and culture of our native lewisias, which are his special interest. That he had received only "rather vague" answers to his similar request to the Royal Horticultural Society put us on our mettle, and copious and specific information was garnered and dispatched. A lovely Christmas card received attests to his enthusiastic appreciation. A request from the University of Grenoble, France, for a source of seed of Alaskan native plants which it had not been able to find for its alpine botanic institute engaged the attention of Dr. William C. Steere, Director of The New York Botanical Garden, and half a dozen letters at his suggestion have gone out to comb the field for seeds of these Alaskan natives.

Our original letter was printed in newspapers in Berlin and in Newcastle, England, both of which brought us correspondence from readers who had not received our letter originally. It was also printed in journals of horticultural societies around the world we had never heard of, and inquiries have come from members of eighteen such societies, asking specific questions about the growing of one American plant or another, or simply to be put in touch with a gardener over here who is interested in lilies, African violets, orchids or some other plant. A garden editor in England offered to write free an article for the NATIONAL GARDENER, and his story on a phase of English gardening is now in the hands of our editor for a forthcoming issue. Other inquiries of interest: the only florist in Liberia asks how to join the Florist Delivery Service; a Tel Aviv nursery wants to exchange seeds with an American nursery; from Pakistan comes a request for the names of books on fruit culture; from France, inquiry for work with colchicine on doubling of gladiolus; also from the Loire Valley in France a request for a contact to export cut flowers to the American market; a collector of rare plants in the jungles of Colombia offers his services to those interested. An elderly garden friend in England wants us to find his lost brother. (He has been found).

When these letters and their answers are assembled into a book to be presented to President Eisenhower in April, they will constitute a warm and human document as a counterfoil to the troubles of our times.

Answering the letters has led to other projects for the Garden Club of New Jersey, such as sending flowering dogwood trees as a gift to the devastated city of Niigata, Japan, rose bushes for the flower-barren city of Seoul, Korea, and American gardening books for the library of the Alexandria Horticulture Society of Alexandria, Egypt,—all under way.

A request came from the American embassy in Tokyo to the gardening committee of the People-to-People Program for a gift of fifty trees for the city of Niigata, whose famous willows were destroyed by fire in 1955, and in rebuilding the city, funds were not available to replace the trees beloved by the Japanese people. Conger Reynolds, Director of the Office of Private Cooperation of the U. S. I. A., Washington, D. C., has written: "This is the kind of project we cannot handle officially, but it is one which needs to be done in the furtherance of international understanding. Your garden club is making the kind of contribution which carries out the purposes of the People-to-People Program."



It was typical of the Garden Club of New Jersey that it voted to replace the burned trees with the Japanese willow, or whatever tree the Japanese themselves preferred, and it was typical of the Japanese city officials of Niigata that they expressed a preference for "an American tree, so that all will know of your generosity". Arrangements are completed, and fifty five-foot white flowering dogwood *(Cornus florida)* will be shipped by air as soon as they can be dug from the cooperating Princeton Nurseries in New Jersey in late February or early March. Through the good offices of the director of the International Advisory Council, Pan American Airways has assumed the problem of air transportation without cost to the garden club. The trees will first be placed in a nursery in Japan and after acclimatization, they will be planted "in a place of honor along the streets of Niigata, at which time appropriate ceremonies will be held". A member of the garden club expects to be in Japan to attend these ceremonies.

"Roses for Korea" came as a similar request from the U. S. Embassy in Seoul: "Something without practical value that serves beauty alone—not the usual image of America but one which should be projected because it is part of the rich American fabric, and even more important, it is one on which a great value is placed in the Orient among the intellectual leaders," so wrote G. G. Wynne from the U. S. Embassy in Seoul. He continues, "There are practically no roses in Korea, there never were very many and the war wiped out the little there was. Flowers generally are quite expensive and rare, except for some rather pretty wild-growing varieties of daisies. Anyway, it would be a wonderful gesture if the

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FLOWERS OF THE MIDNIGHT SUN

in the Canadian Arctic

By Mildred U. and Raymond D. Wood

From the address given by Mr. and Mrs. Wood at the American Horticultural Congress, Williamsburg, October 1958. The address was accompanied by superb photography which will be shown at The New York Botanical Garden when Mr. and Mrs. Wood lecture there on April 18, 1959.

THE WORD "arctic" as applied to plants is usually hyphenated with the word "alpine," and this relationship would seem to afford a logical point of beginning. It is a truism that the arctic-alpines have always led a precarious existence. Following each successive wave of glaciation, with its advance southward and retreat northward, there ensued a corresponding advance and retreat of arctic plants. During the course of these mass migrations many communities of arctic plants were left stranded on mountain tops far south of their former homes. Here they established themselves in a situation similar to the Arctic in many respects. Thus isolated, some have evolved through the thousands of years into separate and distinct species, and of course the evolutionary process still continues. As a result, the arctic-alpine flora has come to have two major subdivisions: first, *beyond* the treeline in the Arctic; and, second, *above* the treeline in the mountains. We shall concern ourselves exclusively with the first category.

Before presenting the arctic flowers in pictures, it seems desirable to discuss briefly certain factors which affect, control, or limit plant life in far northern areas. Probably the most important of these is insolation. It is true that much of the Arctic has continuous daylight during the growing season. However, the sun is always at a low angle, and its rays must penetrate diagonally a much thicker atmospheric layer than is the case in temperate zones where the incidence of the sun's rays is more nearly vertical. Thus much of the sun's warmth is filtered out by the atmosphere and never reaches the earth's surface. Contributing also to the sun's ineffectiveness is the fact that most of the North American Arctic has a climate distinctly maritime rather than continental. Consequently during the summer growing season the great masses of water and water-borne ice are much colder than adjacent land areas, causing frequent and extensive fog and cloud cover. As a result principally of these factors, we have the arctic phenomenon known as permafrost, with the earth perpetually frozen to depths of a thousand feet or more. During the very short summer the reduced warmth of the sun is able to thaw the surface only slightly, to depths ranging from a few inches in the case of heavy, peaty soils, to two or three feet in sandy, gravelly areas.

Thus created by the sun's ineffectiveness, permafrost in turn plays a vital part in connection with another element essential to plant life—moisture. It is perhaps surprising to learn that the Arctic receives but little precipitation, varying from a minimum of about two inches per year to a maximum of sixteen, with a probably fair average of seven or eight. Were it not for the fact that the permanently frozen soil, a short distance below the surface, prevents the scant surface water from penetrating to depths beyond the reach of plant roots, most of the arctic zone would be a lifeless desert.

Permafrost further affects plant life by being responsible for soil movements. During the early summer the thawed surface layer, underlain by the permanently frozen and impenetrable subsurface, reaches a critical point of water saturation. At this point, on sloping ground, the surface mass slides downward in soil creeps and mudflows known as solifluction. On level ground, where the melt water cannot escape because of the permafrost, the surface layer remains saturated. In mixed soils of stone and clay this condition, together with the alternate freezing and thawing, causes a churning movement and a sorting of the soil particles that results in the formation of stone and mud polygons. In more peaty soils this same action is in part responsible for the hummocks or tussocks which are characteristic of mature tundra. These processes are inimical to plant growth. While tufted species and those with moderate root systems may not suffer excessively, those with extensive root systems are particularly vulnerable.

Cassiope tetragona,
"Sentinel of the Arctic proper"

Epilobium latifolium
official flower of the Yukon Territory, Canada

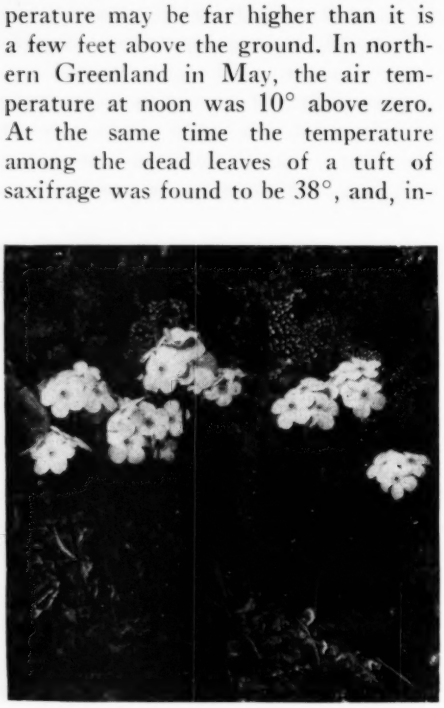
Winds in the Arctic tend to be ever-present and frequently of considerable force. This also affects plant life unfavorably, not only by its drying effect on stems and foliage, but also by the mechanical abrasion caused by wind-blown sand, ice, and snow crystals.

Next, snow cover is a factor important to arctic plant life. A snow*bed* is a large mass of snow which melts late. While it affords the advantage of a continuing water supply during the growing season, in unfavorable years the snow may melt so late that most plants may not have time to flower and ripen fruits. Such areas are successfully occupied only by those plants which can complete their seasonal cycle quickly, or by those which are adapted to vegetative reproduction. A snow*patch* on the other hand, is found in a shallow depression in the landscape, where a snowdrift forms regularly each year, giving plant life winter protection, but melts early and does not materially shorten the growing season. Plants with woody aerial stems, such as willows, heaths, and ground birch, are found chiefly in snowpatch habitats.

Arctic soils are generally acid and tend to be sterile due to poor drainage, poor aeration, cold climate, short summer, and low soil temperatures. Because organic decay by bacterial action is extremely slow in the Arctic, the soils are deficient in nitrogen, phosphates and other salts. In locally enriched areas near animal burrows, dog runs, bird cliffs, and human habitations, past and present, arctic flowers respond with lush and luxuriant growth.

I have left until last the subject of temperatures, because it is probable that the unfavorable effect of low air temperatures during the growing season is much less than that of the other factors discussed. Our own experience in the Arctic indicates that air temperatures in July may range from a few degrees above freezing to as high as 70° or even 75°, with average of 45° to 60°. The diurnal variation between day and night temperatures is, of course, much less than in alpine situations.

The Arctic's dark-colored soil and vegetation absorb heat, and there is created a micro-climate wherein the temperature may be far higher than it is a few feet above the ground. In northern Greenland in May, the air temperature at noon was 10° above zero. At the same time the temperature among the dead leaves of a tuft of saxifrage was found to be 38°, and, inside a cushion of dark mosses, 50°. Thus within the plant cushion there may exist temperatures high enough for photosynthesis, at a time when the meteorologist would record several degrees below freezing.



Androsace chamaejasme var. *arctica*

Finally, even if the weather during the growing season is particularly unfavorable, arctic plants are able to survive alternate freezing and thawing of their growing parts, a process which would be fatal to plants of temperate climates.

To Be Continued

WORLD FRIENDSHIP (from page 42)

local "friends of flowers" association, a hobby group of amateur gardeners and flower arrangers, were presented with enough rose cuttings to plant a sizable bed in the public gardens surrounding the capitol building for the enjoyment of the citizens of Seoul.

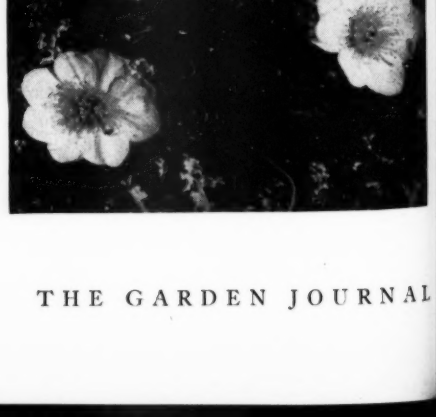
"While our aid program necessarily concentrates on basic industries and agricultural production aids such as fertilizers, I feel that a relatively small aesthetic gesture of the kind described, particularly if carried out through private initiative, would have a disproportionately large public opinion impact."

The garden club, being good gardeners, felt that rose cuttings would not be practical and sixty of the finest and hardiest two-year-old plants of hybrid tea, grandiflora, floribunda and climbing roses selected by Sidney Hutton, president of the Conard-Pyle Co., which is cooperating in the project, will be sent by air to Seoul the first week of March. Already books and pamphlets on rose care have been dispatched to Lee Chong Koo, chairman of the "Ever-Beautiful Society" of Seoul, who will receive the rose bushes and will be responsible for their care. He writes, "Our country has a very good climate and earth to cultivate rose bushes. In spite of having such a good condition, it is very regretful that we don't have any sufficient rose bushes to cheer people. Now we are very glad to expect we could have beautiful flowery hills in Korea by your kindness."

The sixty bushes, which are being sent by the Garden Club of New Jersey, may be the beginning of a larger project in which others may be asked to participate. If this first shipment is successful, effort will be made to fill the desire of the "Ever-Beautiful Society," whose chairman asks: "I have to cordially ask you to send as much rose bushes as possible, for we almost completely depend upon your help in decorating our city with rose bushes. We want to plant those rose bushes at National Cemetery where now dead

(Continued on page 72)

Dryas integrifolia, official flower of the Northwest Territories, Canada



MODERN TREE CARE

By Philip L. Rusden

TREE CARE has gone modern in methods, materials, equipment and know-how applied by forward-looking, trained personnel.

The mere possession of a saw, rope and a paint pot no longer suffices to put a man in the tree care business.

The old guess-and-try technique of the so-called "tree surgeon" survives only in the comic strip and cartoon.

In recent years, notably since World War II, tree care has made big-league strides based upon an ever-increasing amount of research. Divergent lines of investigation in the laboratory and the field converge to contribute to better and more up-to-the-minute tree care.

Today's arborist is in partnership with the chemist, nuclear physicist, engineer, botanist, physiologist, entomologist, plant pathologist and geneticist, all in a vast scientific army.

IMPORTANCE OF TREE CARE

There is sound reason behind all this: never before has tree care become so significant.

The exploding population of America results in nearly a million new home sites every year. Trees in turn enhance real estate values. They are worth more in dollars and cents than ever before. They are an investment worth preserving.

Esthetically, their worth is immeasurable in money. They muffle high decibels of traffic noises, keep clean exhaust-fume laden air, act as outdoor air conditioners in summer and blunt angry winds in winter.

A domesticated tree, on a lawn, in a park, along a street, must struggle to survive. It faces man-made handicaps no forest tree ever encountered.

When a woodland tract is opened up for home development, some existing trees are allowed to remain. They are alluring to the new home buyer. Yet from one to five years later such trees frequently go into decline and die.

Bulldozers have compacted soil around their roots, ripped up fibrous roots, or scraped away vital topsoil to alter the water table. Suffocating fills are often added in grading, or roots mutilated when utility pipes are installed.

Trees on long-established home sites may suffer no less. Soils wear out and are not replenished. Storms wrench loose roots, twist and slip the bark of trunk and larger limbs. Searing heat and drought often kill hair-roots and cause twigs to dry out. Then branches and larger limbs begin to die. Driveways and walks may deny such trees adequate soil water.

Outdoor grills wheeled beneath trees, like autumn bonfires, can scorch the branches above. Backyard trees used as clothes line poles may be girdled. Bumps from a lawnmower may be the start of a chain reaction that could end in death.

Nature itself is no kinder to trees. Diseases and insects, many of them brought in from alien lands, are on the increase. The accumulated effects of drought and heat — during the past twelve years there has been subnormal rainfall and higher-than-average mean temperatures—have been harsh. Violent wind, ice and hail storms are tree enemies too.

SEEKING THE CAUSE

A branch may wither, a limb die. In the old days a tree man pruned it out and let it go at that. Today, as a diagnostician as well as a tree man, he seeks out the cause and treats or removes it.

Was the limb killed by borers, bark beetles, an internal fungus infection, an infestation of scale insects, damage to a subterranean part of the tree, heat or cold, lack of sufficient water, a smothered root, the wrench of a storm, the pelt of hail, the tattoo of sapsuckers, an eroding canker?

The modern tree man has instruments and methods to aid his diagnosis. If an elm, for example, is suspected of Dutch elm disease, a sample taken from a wilting limb will indicate by laboratory culture the state of health of the tree.

The tree man is better schooled in horticulture, botany and the other sciences than his predecessor. He knows what to look for and where. Some modern tree firms have trained scientists on their staffs. Less pretentious arborists rely on the technical advice of state and federal experiment stations as well as the well-staffed laboratories of manufacturing chemical and engineering concerns. More and more, the practising arborist is using the results of biological, chemical and other research in his approach to diagnosis and solution of tree care problems.

The tallest tree can be covered with a mist, fine-spray or fog in a matter of minutes.

THE SEEN AND THE UNSEEN

To a tree owner a tree is in trouble when dead wood appears in the crown, the leaves become blotched and "buggy" or fall prematurely.

To the tree care expert with a trained eye, this is a challenge to look for the "unseen." It could be caused by a girdling, choking root at the soil line, an incipient heart rot cavity, shoe string fungus eating away roots like acid, tattle-tale shot-like holes in the trunk caused by invading borers and beetles. It could be an infestation of unnoticed scale pests, mites and aphids or fungi at work. Shortened twig growth over the past few years or mal-formed buds for next year may tell the story of decline that began a long time ago.

HOW THE TREE MAN WORKS

Pruning out the dead wood is a mechanized task that requires proper tools. Although the rope and saw are still items of standard equipment for the tree man, they are being superseded. A hydraulic lift sends a man high into a tree speedily and safely. Pneumatic pruning tools, gasoline or electric chain or reciprocating saws remove undesirable or diseased limbs and, where neces-

sary, cut down entire trees in a matter of seconds.

Where cavities are to be filled, the modern arborist employs power-driven chisels and gouges. The filling used is carefully tested, scientifically developed to promote healing, resist decay, and flexible enough to conform to the varying shapes and sways of a tree.

A Chemist in the Tree Top

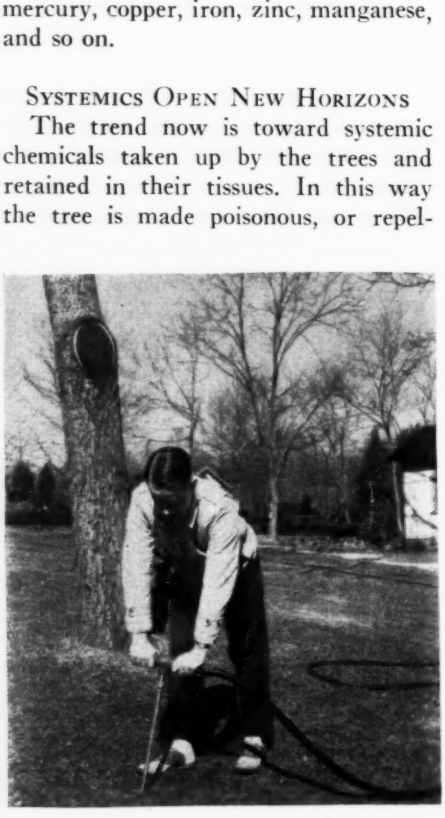
To spray a tree either as a shield against insects and fungus diseases, or to combat them once they are harbored in a tree, the arborist has modern high-pressure equipment that can cover the tallest tree with a mist, fine spray or fog in a matter of minutes.

Perhaps the greatest progress in modern tree care has been made by the research chemists, who have given the tree man effective materials to work with. More than six thousand compounds and formulations are available for controlling insects and diseases, promoting tree growth, retarding growth, feeding, checking dehydration, and killing weeds and unwanted trees.

Chemists have given the arborist DDT, malathion, lindane, kelthane, 2,4-D, 2,4,5-T, organic compounds of mercury, copper, iron, zinc, manganese, and so on.

Systemics Open New Horizons

The trend now is toward systemic chemicals taken up by the trees and retained in their tissues. In this way the tree is made poisonous, or repellingly repugnant, to insects and disease organisms.



In invigorating a tree, liquid food is injected into the soil through the nozzle of a feeding drill under high pressure.

Chemotherapy is the plant pathologist's term for the introduction of chemical substances into the conducting tissues of a woody plant, and has been used successfully in combatting disease organisms such as viruses, bacteria and fungi.

Whether insect pests are combatted by insecticides on the outside of a tree or by a systemic within, it is important to know when they are in the most vulnerable stage. That is why life histories of insects are studied to determine at what period of their development they can most effectively be controlled. Knowing what to use and timing of selected modern insecticides are key factors in spraying.

Physiological ailments that can befall trees are legion. Tests to determine soil acidity (pH) are made with potentiometers. Gas detectors are used to locate the source of dangerous fumes. Special devices are employed for aerating roots and injecting liquid nutrients into the root area.

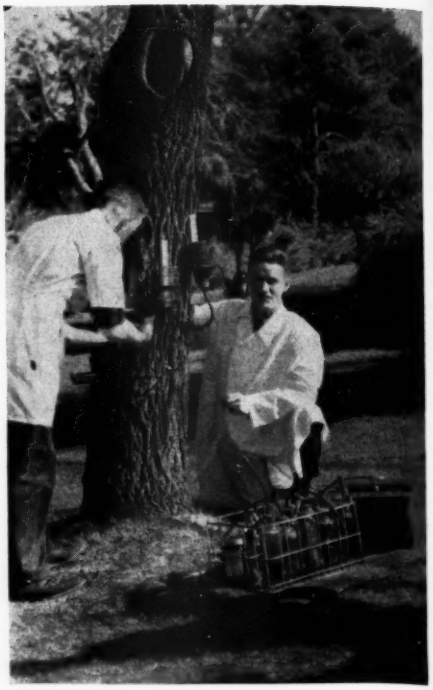
Modern tree food is placed around the roots, down where it does the most good, with the aid of electric or pneumatic tools.

Transplanting trees is a specialized and important phase of arboriculture in which great advances have been made. Today's large trees are moved with the aid of special cranes, back hoes, shovels, flat-bed trailers, tree-moving trucks, cables, winches and protective coatings of plastic to keep them in the best possible condition while transported from one site miles away to another. Then, to overcome shock and until the tree is oriented in its new life, recuperative care as tender and scientific as a bedside nurse would give a human patient is administered.

Even shade trees themselves are becoming streamlined and modern. For centuries man depended upon plant hunters for the discovery of new tree species and varieties.

Developing New Tree Forms

Today modern genetic research, applying techniques of the radiation laboratory, has recently begun to hasten the production of mutations. Formerly, one had to wait centuries to find in nature a new form of tree. Today the process can be hurried and hurtled through time by radiation at the hands of the genetic botanist who selects desirable forms.



Trees with internal diseases are treated by chemotherapy — the injection of chemical compounds into the sap stream. The substances flow from bottles inverted on the trunk into the conducting tissues.

Trees formerly known only in broad and spreading habit can now be modified to dwarf, cylindrical, pyramidal or other forms to fit given environments. Trees are also being bred resistant to disease, heat, drought, cold or insect damage.

Isotopes developed by the nuclear physicist enable the tree man, backed by research workers, to determine the speed and effectiveness of a systemic insecticide or fungicide injected into a tree's vascular system. And where outbreaks of certain pests occur, it is even possible to reduce the insect population by sterilizing certain of their numbers then unleashing them in a critical area.

In all his modern ways, with all his newest tools, today's tree care man has but a single aim: to preserve America's trees. He can best do this by preventive action — periodic feeding to maintain tree vigor, pruning and sanitation to eliminate weakened and dying wood and to give a tree structural strength and beauty, and spraying before the insects strike and fungi alight. The green leaf must be kept green.

But where neglect occurs, tree vigor

(Continued on page 67)

BEAUTY AND THE BOAST

By Robert W. Schery

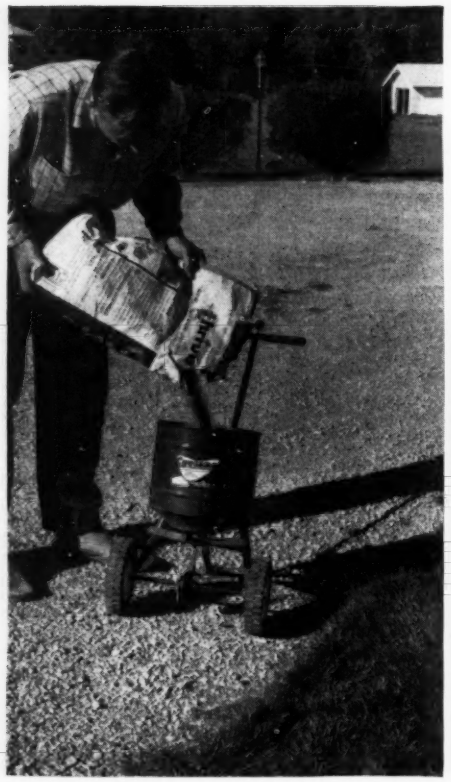
Upper. Although clippings might be left on the lawn, rotary mowers can "vacuum" them up for those who prefer to catch the clippings.

Lower. Weeding along with feeding keeps sparkle in the lawn.

WHEN Jim declared before Christmas that his sticky clay pile just might become the prize lawn on the block, "they said it couldn't be done." His beauty spot-to-be lay muddled and puddled as new home construction dragged late through autumn, the monsters delivering pre-mix squeezing every last iota of oomph out of foundation subsoil not graced with much structure in any event. Of course, Jim must fulfill his boast to make our yarn a red-blooded success story. Here's how.

Santa provided finishing touches to the new home; final grading was possible, with the lawn bull-dozed level, before main freeze-up. This was good, for it allowed winter's freezing-thawing to loosen that badly compacted soil, restoring aggregation squeezed out by the trucks. Jim even employed the firm footing of a frozen surface to spread twenty pounds of complete fertilizer each one thousand square feet (the symbol M signifies this much area). Had the dwelling been ready in early autumn, he would have preferred mixing the fertilizer and some peat or compost several inches deep into the seedbed with rotary tiller, or disc dragged by the construction outfit's tractor.

Autumn would have been the best time, too, to sow the bluegrass lawn. Soils are workable then, warm enough to hasten seed sprouting, while the shortening days make it easier to keep the seedbed moist. The young bluegrass and red fescue seedlings, both of which love cooler weather, would have been well established from an early September start and had the jump on weeds and next summer's tribulations. Southern grasses—bermuda, bahia, centipede,



Keep good turf thriving with regular fertilization. Always fill spreaders off the lawn, for any plant food spilled will burn the grass.

Below. Today's mechanical devices take tedium out of lawning. A wheeled sprayer, generating standard pressure on pushing, blankets the lawn uniformly with pesticide.

zoysia, st. augustine, carpet—would not be seeded or sprigged until spring, since they grow little in cooler seasons or wouldn't sprout at all.

As it was, Jim did the next best thing — sowed the best seed available, a bluegrass mixture devoid of so-called nursegrasses (usually ryegrass), onto frozen soil along with the fertilizer. He made sure there were no coarse bunchgrasses in the mixture, like tall fescue, timothy or orchard grass. His was to be a lawn of only the finest sod-forming perennials, of narrow-leaved elegance. Good seed may lie dormant in frozen soil, until spring's warmth nudges sprouting. It's so much easier to complete the planting on frost-pocked winter soil than to await the uncomfortably soggy soils of spring, and the risk of not getting the seeding done early enough. Bluegrass started late in spring chances demise from weed competition and summer heat.

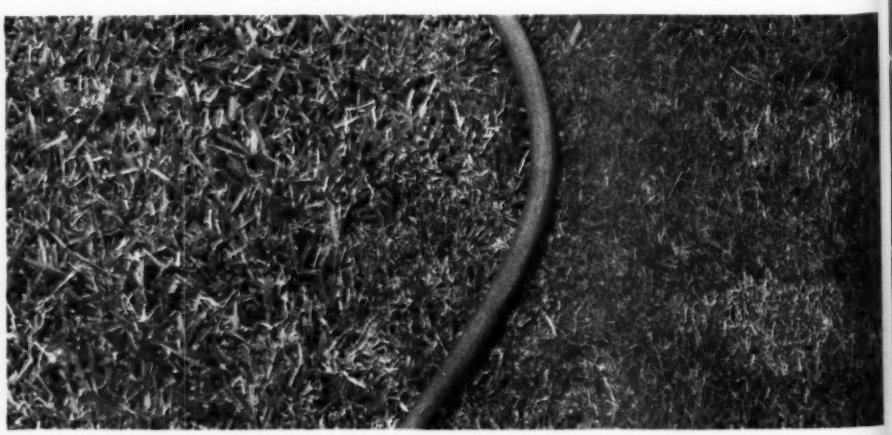
Of course, in autumn, winter, spring or summer a good seeding merits a mulch. Any locally available stuff which will mesh loosely should suffice—sphagnum moss, wood chips, grass clippings, or burlap netting, for example. Straw is undoubtedly the most used. In autumn a layer a few straws deep would have been invaluable for retaining moisture, hurrying sprouting. In winter, it served chiefly to protect Jim's soil and seed against wash. Organic mulches can simply be left to decay in place, contributing their humic remains to the good of the soil.

In early spring the first bluegrass plantlets were poking saucy sprouts through the mulch. Each, upon reaching full capabilities, would expand by tiller and rhizome, knitting plant into plant to make the tight bluegrass sod so welcome underfoot in spring. As expanding plants squeeze more tightly shoulder - to - shoulder, little room remains for weeds. The best cure for weeds is a thriving sod.

There were things to be done, as Jim nourished hopes of a picture lawn that first year. The schedule called for additional feeding, early in spring, at about ten pounds /M, and this repeated at least a couple of times through the growing season as long as weather didn't turn 90° hot. The better northern lawngrasses go partly dormant when weather becomes that uncomfortable, and the nourishment goes instead to hot-weather culprits like crabgrass. In the South one would feed right on through summer, where the southern lawn beauties delight in the heat.

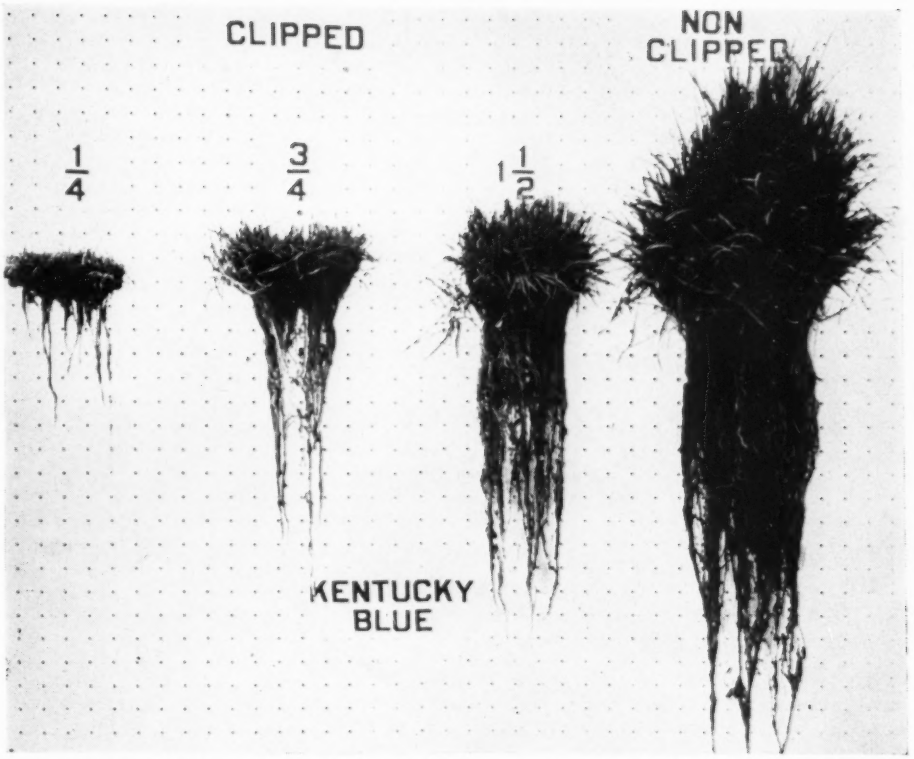
Ample fertilizer and a good bluegrass seed mixture are the main additives to northern seedbeds. Soil is preferably not pulverized to dust.

Below. Only by choosing proper seed can the resulting lawn be satisfactory. Cover from "cheap" seed on the left is mostly tall fescue and rye grass; contrast this with the permanent turf of bluegrass-red fescue on the right.



Another spring consideration is the weeding of a turf not yet mature enough to fend for itself (if a lawn ever be, completely). The grass should be old enough to have had several mowings before any weed killers are applied. Bluegrass is remarkably resistant to chemicals (except the Merion variety which yellows with PMA), but red fescue selections need a little more consideration (although not as much as bents). With Jim's late start there would be spring dandelions, henbit, chickweed and, later, plantains *et al.* As weather warms in middle spring a 2,4-D weeding is the easy way out; but it cannot be allowed to drift onto ornamentals — it can be deadly there. The garden store has formulations for spreading dry, for dilution for spraying, or for siphoning the concentrate into a proportioner nozzle for the garden hose. Some are compounded with fertilizer for completing spring chores 2-in-1. And there is even 2,4-D in a wax stick to be dragged behind the mower!

Which brings up a very important spring subject—mowing. Of time spent tending lawn, most will be in mowing. It pays to prepare for the worst by equipping with the best in the very beginning. A good mower, which can mow the whole lawn in a refreshing after-supper interlude, makes lawn care fun; balky equipment, small and not maneuverable, is a headache. If there are any two items in lawning where a home owner should indulge himself, it is for good seed to get the right kind of grass, and a good mower to tend it with facility. Spring, when northern grasses exhibit indomitable vigor, will really test the mower.



Does mowing height make a difference? Tests by Dr. Roberts of Massachusetts show that weaker root systems result when more green leaf is clipped.

Whether the mower is to be power or push, riding or walk-behind, will depend upon taste and what one has to spend. Reliable brands are all well constructed, with many conveniences today unthought of when dad was shirking his chores. They have to have recoil starters, easy height adjustment, accessible controls, and so on, in the competitive modern market. Rotaries outsell reels, perhaps partly because of slightly lower initial cost, and certainly because of versatility and maintenance simplicity. Rotaries cut well at any height, whereas reel mowers "blow down" the grass when set higher than about two inches. Some older models won't even adjust for clipping that tall and are best not used with bluegrass-red fescue turfs (which like tall clipping, at least where summers are hot).

Rotaries cut by impact, the whirling blade traveling more than fifteen feet per second where the cutting edge hits the grass. (Never get a finger or toe near, nor work on any mower while it is running.) Rotary blades can be filed sharp at home. In contrast, reel mowers must be sent out for sharpening. Adjustment has to be "just so." Reels cut by blades slicing down against a stationary bedknife, like the two blades of scissors; reel and bedknife must be as perfectly aligned as is scissors. A good reel can perhaps provide more perfect mowing of close-clipped bent, bermudas and zoysias than a rotary, while rotaries are the all-purpose instrument (even leaf chopping) for the average lawn. Those rotaries which suck up grass may help thin trailing stems that tend to mat, perhaps helping keep bent in bluegrass less patchy. Current models with strong

(Continued on page 64)

The best lawn comes from vigorous sod which has withstood the test of time. Here is bluegrass seed harvest in Kentucky, stripping machines to the right, sacked "green" seed in the left foreground.

Begonia 'Leo C. Shippy'

Begonia 'Ricky Minter'

Begonia 'Fischer's Ricinifolia'

THE RHIZOMATOUS BEGONIAS

By Mary Ellen Ross

TO WRITE a complete article on all types of begonias would be, to me, an impossibility; for when a person mentions a begonia, my mind swiftly travels through many different groups, trying to visualize just what type of begonia is meant. To some the name begonia simply means the gorgeous camellia-flowered tuberous type which we see in shady places, window boxes and elaborate gardens in the summer time only. The more demure person might think of a begonia as the common wax type, *B. semperflorens*. This is among the easiest to grow and most commonly found in house culture. Cultivars have now extended from the ordinary single green leaf type to double-flowered in green and red leaves, which are called "rosebud" begonias, and semi-doubles which are often classed as "thimbleberry-flowered." Also the rare callalily begonia belongs in this group. But then again, should it be Grandma speaking, she no doubt would think of the begonia as one of the rhizomatous types. Perhaps the one they call the "star" or "finger-leaf" would, to her, symbolize begonia. One would have to describe hundreds of types even to begin discussing the outstanding cultivars in each of the various groups. Therefore I feel more information can be given if I confine this article to one particular group.

Most versatile, and perhaps the hybridizer's favorite, is the Rhizomatous Group. In my business of growing plants I constantly receive requests for the old-fashioned "star" begonia accompanied by many descriptions. Some are looking for the one listed under the name *B. sunderbruchi,* others describe *B. ricinifolia,* and still others want *B. heracleifolia*—all are commonly called "star" begonia.

Let's start from the beginning and see what constitutes a rhizomatous begonia. As a rule, this grows from creeping stems which we call rhizomes. These stems usually branch and can easily be divided to make new plants. Sometimes the plants grow upright, although they usually have the thickened stems and consequently are called Upright Rhizomatous.

Flowers in this group are borne on long stems, usually high above the foliage in either small or large clusters, drooping or upright. Their regular season for blooming is winter and early spring. A few types may extend their season into the summer or spasmodically throughout the year. From February to May the whole group will put on a splendid show of flowers in many different tones of pink and white.

The foliage of this group is typically on long stems, similar to the flowers which rise from the rhizomes. The leaves are of different colors and shapes, some star-shaped, some rounded, others merely lobed, and choicest of all are the curled and crested-leaved types. The size of the plants varies from giant-leaved to miniatures.

Perhaps this particular type of begonia has lasted through the ages because of its durability. Many begonias are delicate to handle and will not grow in certain parts of the country because of adverse weather conditions; but the rhizomatous begonias are adaptable to extremes in temperature and different types of soil. They endure the humid, hot summers of Florida, where many other begonias fail to grow; they stand a great deal of drought and are not subject to many diseases or pests.

This durability is due to the ability of the rhizomes to store food and moisture to carry through extreme conditions. Thus this type of begonia is best suited for the beginner, since it requires no great horticultural skill to grow it and lends itself to the adverse conditions of today's heated homes.

One of the worst enemies of the rhizomatous begonias is the nematode, a microsopic insect in the soil which forms on the roots, causes small swellings and eventually may strangle the plant. When these are detected, it is best to throw the plant away or isolate it, so the nematodes will not spread to other plants. The insects are able to work their way up to the very tip of the stalk, and it is almost impossible to propagate clean stock, as can be done with begonias which do not have the thickened stems.

Propagation of the rhizomatous begonia can be undertaken in several ways, chiefly by divisions of the root-stock or by cutting the rhizome in sections and rooting them. Types that grow more upright are easily rooted from cuttings, and most varieties can be rooted from their leaves like African violets. The best time to propagate is after the blooming period, June to October.

These begonias will grow in almost any type of soil, be it heavy or light, but are at their best when grown in a woodsy soil, containing fifty percent peat or leafmold and good garden loam with a little sand and manure or bonemeal. In fact, it has been reported that rhizomatous begonias prefer a heavier soil than most begonias. Mine, however, are not pampered in this way; I have only one begonia soil formula which I use for all types.

When it comes to watering, most begonias do best if they are allowed to

become slightly dry between waterings, and most of the rhizomatous are at their best when grown on the dry side.

Rhizomatous are especially adaptable to a wide range of light intensity. Many cultivars grow well in very little light, but a northeast or northwest window where they get early morning or late afternoon sun is ideal. In winter they grow well in full sun, but shade should be provided at other times of the year.

Space and time do not permit me to name and describe all the rhizomatous begonias I know of or have in my collection, which now includes about fifty. I shall describe briefly the most outstanding from the standpoint of historical significance or popularity.

Begonia heracleifolia, discovered in Mexico in 1830 by Deppe and Schiede, is commonly called the "cow parsnip" begonia. It is of importance only because it is one of the parents of the famous 'Ricinifolia.' As it is too large for the modern home, it is a collector's item only. There seems to be some disagreement as to what the other parent of 'Ricinifolia' is, as Buxton claims *B. nelumbifolia* and Krauss claims *B. peponifolia.* Regardless, 'Ricinifolia' is still popular today, although introduced in 1847. It has been called the "castor bean" begonia as well as the "star" begonia. One of its predominating characteristics is its red, hairy stems and coarse red hairs on the veins under the leaf. Although this is not as large as its parent, it still makes a giant plant and needs a lot of room. The flowers are rose-pink on tall stalks, sometimes up to four feet in height. 'Fischer's Ricinifolia' is smaller and more compact and is usually the variety offered in the trade today. 'Marian' and 'Immense' are two other beautiful seedlings.

Although begonia 'Ricinifolia' is the parent of many noteworthy hybrids, the most famous of all is 'Sunderbruchi,' or is it B. *heracleifolia sunderbruchi*? Buxton and Krauss again do not agree. Krauss claims it to be 'Ricinifolia' and Buxton a form of *B. heracleifolia.* Nevertheless, it is without a doubt one of the most beautiful and best-loved begonias in this group and is still winning blue ribbons at shows, although it has been grown for more than sixty years. It is also called the "star" begonia, but as a child I knew it in my father's greenhouse as the "lady finger" begonia because of its seven finger-like lobes. This is a gorgeous dark-leaved plant and the variety 'Nigricans' *(B. heracleifolia nigricans)* is even darker and smaller growing and reported as sometimes having nine lobes.

Begonia 'Fuscomaculata,' thought to be a hybrid of *B. heralcleifolia* and *B. strigillosa,* was developed in England in 1883 by William Bull. It was first named 'Rubella' but that was later changed, as that name had already been given to another begonia. 'Fuscomaculata' has inherited the star shape of *B. heracleifolia* and this, combined with the chocolate markings of *B. strigillosa,* makes a beautiful plant. Following in her train are other chocolate-marked begonias. One in particular, which amuses me, is 'Page 13.' This, believe it or not, was so named because of the illustration which was on page 13 of the March 1939 issue of the JOURNAL OF THE NEW YORK BOTANICAL GARDEN.

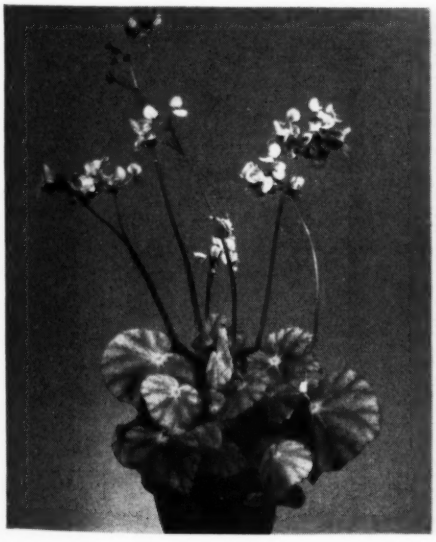
I like 'Paul Bruant,' chiefly because it has such large beautiful pink blooms in winter. It is an old French hybrid, raised by M. Bruant in 1881 from a cross between *B. heracleifolia longipila* with *B. frutescens.* One of its interesting characteristics is the small plantlets which grow on the thick stem. With its five-lobed, deeply serrated leaves, 'Paul Bruant' is always attractive in or out of bloom.

One of the prettiest of the star-shaped begonias of recent origin, with entirely different parentage, is 'Silver Star,' introduced by Elsie Frey in 1945 by crossing *B. caroliniaefolia* with *B. liebmanni.* Its silvery, deeply-cut leaves are strikingly beautiful. It is an easy grower and when young stays quite compact. Using 'Silver Star' as one of the parents, Bess Shippy originated the variety 'Brocade,' which has a different star-shape and a lovely iridescent glow to the silvery leaves.

Another one of Bess Shippy's hybrids is 'Niagara,' a chance seedling introduced in 1941. This is obliquely heart-shaped and pointed and appears to be of *B. heracleifolia* lineage. The thick, glossy, olive-green leaves are golden-brown hairy, when young.

'Legacy,' also introduced by Bess Shippy, is a bronzy olive-green, semi-star-shaped, with red under the leaves and white blooms tinted pink. Mrs. Shippy's crowning glory, however, is the exotic star-shaped 'Leo C. Shippy.' Its large bronzy star-shaped leaves are

Begonia mazae



Begonia manicata aurea

Begonia aridicaulis

Begonia 'Skeezar'

covered with minute red hairs which give it velvety glow. Begonia 'Leo C. Shippy' is a husky grower and makes a gorgeous plant.

Before we leave the star-shaped begonias, there is an old favorite, still popular, which should not be omitted. It is best known by its common name, 'Mrs. Townsend,' but was introduced in 1895 by Veitch in England under the name of *B. heracleicotyle*. The name originates from Heracles, Greek for Hercules, and from cotye, meaning cup. It is a cross between *B. heracleifolia* and *B. hydrocotylifolia* and has inherited the lobed leaves of one parent and small compact habit of the other. Leaves are a shiny bronzy green above and red beneath. It bears an abundance of small pink flowers, which are said to have the fragrance of Siberian wallflower during the day. A larger form is *B.h major* and *B.h.* 'Venus' has darker foliage.

Begonia manicata has equally as fascinating history of prize-winning hybrids as has *B. heracleifolia*, which preceded it by only seven years. Discovered in Mexico in 1837 by Linden, *B. manicata* has pale green, oval leaves with margins which are toothed and slightly hairy. One of its main characteristics is the collar of coarse red hairs at the top of the leaf stalk. The small pale pink flowers are borne in airy sprays on long stems.

Recently I have received many requests for the yellow-spotted leaf variety of *B. manicata,* whose full name is *B. manicata aureo-maculata;* if you are looking for the curly-edged form, then just add *crispa* to the already overworked name and call it *B. manicata aureo-maculata crispa.*

Begonia manicata is also the parent of 'Erythrophylla,' commonly called the "pond lily" begonia because the leaves are round, similar to a lily pad, or 'beefsteak" because the underside of the leaf is a dark red. A certain Dr. Feast of Baltimore thought 'Erythrophylla' much too technical and, consequently, named it after himself; hence it is also well known as 'Feasti.' Although still popular, its more attractive mutant, 'Bunchi,' is more in demand, because of its curled and crested edges. Another pretty form is 'Erythrophylla Helix,' whose spiraled leaves are ruffled at the margins.

The minature 'pond lily' begonia, *B. hydrocotylifolia,* another Mexican species introduced in 1841, could be classed as one of the first miniatures in this group. It has very small, medium-glossy leaves which are about the size of an English penny; hence its common name, the 'pennywort' begonia.

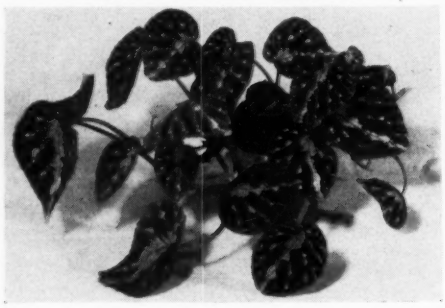
One of the more recent hybrids of 'Erythrophylla' is 'Ricky Minter,' a gorgeous large-leaved begonia, with curly edges. This was originated by Marie Turner in 1950 by crossing 'Reichenheimi' with *B. mazae.*

Now the latest news from California is of a beautiful new hybrid of *B. manicata aureo-maculata crispa,* originated by Beth Bath of Santa Anna, which has been named 'Madame Queen.' From the description and picture in the October 1958 BEGONIAN, this is a dark red form and has wide light green veins for contrast.

One of my favorites with entirely different parents than has hitherto been mentioned is 'Skeezar,' developed in 1947 by the noted hybridizer, Rudolph Ziesenhenne of California. This is a cross between *B. dayi* and *B. liebmanni.* The leaves are a lovely pattern of silver and green, and I especially like its compact growth and sturdy habit.

A discussion of the group would not be complete without mentioning a few of the more difficult begonias. It is positively aggravating to see the beautiful

Begonia pustulata argentea



Begonia 'Sunderbruchi'

plush, dark olive-green leaves of *B. imperialis* and to realize that few have success in growing it. My few plants, acquired some ten years ago, finally grew large enough to allow propagation; and now I am gradually making a few pennies on the space they have been occupying. Both *B. imperialis* and *B. imperialis smaragdina* were discovered in Mexico by M. Ghiesbreicht in 1859. The leaves of *B. imperialis* are olive-brown with irregular bands of bright green along the veins. The whole leaf is thickly set with white hairs, giving it a glistening appearance. *B. imperialis smaragdina* has plain emerald-green leaves without markings and is easier, but still difficult to grow. For these two begonias, it is almost imperative to have a Wardian Case in which the heat and humidity can be controlled. Another similar species, introduced about ten years ago, is *B. pustulata argentea.* Although slightly delicate, it can be grown in normal conditions without a Wardian Case, and having fast creeping rhizomes, it makes an ideal plant for a hanging basket.

More recently Mrs. Susie Zug of California introduced two fascinating begonias by crossing *B. imperialis* with *B. pustulata.* These she has named 'Silver Jewel' and 'Emerald Jewel.' The September 1958 BEGONIAN pictures these two hybrids, and both appear to have the lovely dark emerald-green pattern on the leaf with lighter green background inherited from their parents. If they are as hardy and easy to grow as Mrs. Zug claims, they should soon be in the trade.

In the February 1958 BEGONIAN Dr. Georges Morel has reported two exciting new hybrids of *B. imperialis,* 'Meximperia' and 'Decimperia.'

(Continued on page 59)

CULTIVATED GRASS

By E. O. Gangstad

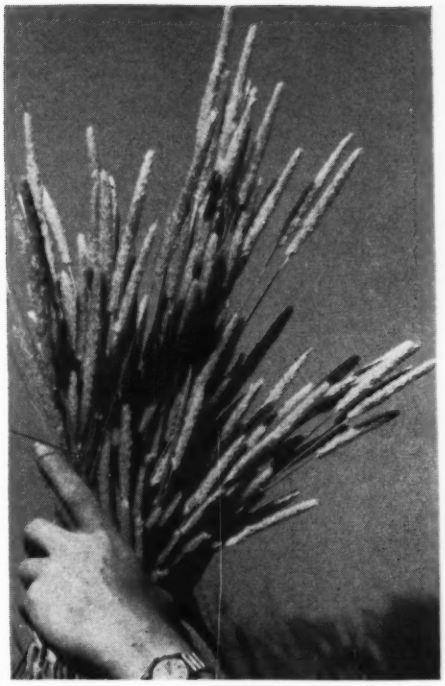
FOR A HUNDRED CENTURIES or more man has intervened in the evolutionary development of plants by the selection of various cultural forms that best suit his needs. Botanically, these selections are known as cultivated varieties or cultivars. Domestic crops, such as wheat, barley, oats, corn, sorghum and the millets are typical examples of cultivated grasses that were developed by primitive man.

The selection of these crops under cultivated conditions has resulted in plants with vigorous seedling growth, highly productive vegetative parts and large uniformly ripened and easily harvested seed. Greatest progress in the selection of these characteristics is apparent in the food and fiber crops of the temperate zones. Much less progress has been made with plants of the arid, tropic or frigid climates.

In modern agriculture, the concept of cultivated grasses involves all factors of plant growth and the environment which affect plant growth. Productive cultivated grasses are able to utilize high levels of fertility, water, and so on for vegetative growth, which is succulent and palatable for livestock feed. It is a common practice to improve cultural conditions for the better production of grasses by various types of tillage, addition of manures and fertilizers, control of undesirable plant competition, and, where practicable, supplementary water.

Selection of suitable cultivated species and appropriate agricultural practices are well developed in humid-temperate climates of the United States. In the sub-humid climates of the United States, efforts to obtain productive grasses adapted to such regions have not been too successful, and improved cultural practices have also been much more limited. Moreover, application of this system of agriculture in a sub-humid climate has cost-limitations that apply only to individual operations so that it is difficult to make general recommendations for its use.

The problem of suitable cool-season perennial grasses has been a limiting factor for livestock production in the Southwest, as this area has developed from a native range to cultivated pastures. However, Harding grass, *Phalaris tuberosa* L. var. *stenoptera* (Hack.) Hitchc., has shown promise as a cool-season grass. Reports from similar climates from such widely separated places as Australia, New Zealand, Oregon, California, Texas, Argentina, Algeria and Cyprus have been quite favorable, but more intensive study of different strains, varieties and related species is needed for better understanding of the general adaptation of this grass.



Harding grass grows to a height of two to three feet from a loosely branching rhizomatous base. The seeds are set on a panicle of compressed seed-heads, similar to other species of Canary grass, and are quite readily harvested by means of the standard type grain combine.

Studies by Texas Research Foundation at Renner, Texas, indicate that Harding grass will give relatively good winter growth and persist during the summer season when planted on the blacklands of northcentral Texas. In years of mild winters fall planting is satisfactory but in general, spring planting, from February through March, is recommended to eliminate the danger of cold injury to seedling growth. Planting in widely spaced rows with interrow cultivation during the year of establishment has given good results. Studies on the use of winter annual legumes, planted between the rows to give a full sward of growth during the grazing season, are in progress. Under this system the amount of ground cover is changed from one hundred per cent cover in the winter to about fifty per cent in the summer.

The root systems of Harding grass (left), Sunolgrass (center) and Koleagrass (right) at the same stage of growth. Note the marked tuber-like basal swellings of Sunolgrass and the large adventitious basal rhizomes of Koleagrass. The more fibrous root system of Harding grass is probably an advantage for heavy grazing, but the storage tubers aid in persistence during the long season of summer drought.

Row nursery plots of Sunlograss (left) and Koleagrass (right) show mature growth of the plants. The seed-heads of Sunolgrass open and disperse their seed as they ripen, making it difficult to harvest this seed mechanically.

Harding grass is a member of the genus *Phalaris,* the Canary grasses, in the tribe Phalarideae. The name, *Phalaris,* is an old Greek word for grass. Species naturalized to the United States include: *P. caroliniana* Walt., distributed over the southern states, and *P. minor* Retz., *P. angusta* Nees ex Trin., *P. lemmoni* Vasey, *P. californica,* Hook., limited to local areas of the lowlands of the South and Southwest.

A number of cultivated species of *Phalaris* are grown in the United States. Reed Canary grass, *P. arundinacea* L., is a tall warm-season long-lived perennial grass grown on the lowlands of the Northcentral States. Canary grass, *P. canariensis* L. is a large-seeded annual grown for bird seed in the South. Harding grass, as mentioned above, is a cool-season forage plant that is commercially grown in Oregon and California. Sunolgrass, *P. coerulescens* Desf., and Koleagrass, *P. tuberosa* L. var. *hirtiglumis* Batt. and Tarb., are under study for forage production at several experiment stations. Ronpha grass, a natural hybrid of Reed Canary grass and Harding grass, is being grown by vegetative propagation under experimental conditions in the United States.

The origin of Harding grass is thought to be in the Mediterranean region, but early reports are somewhat obscure and unreliable. Agronomic use of this grass dates from 1884, when an importation from America was received by the Queensland Department of Agriculture for testing at the Toowoomba Experiment Station, Queensland, Australia. The results of experimental trials were quite promising, and the seeds were eventually distributed locally as Toowoomba Canary grass. In 1908, the Hawkesburg Agricultural College also reported favorably on this grass from results obtained at the Wagga Experimental Farm, New South Wales, Australia. More recent reports indicate that this grass can also be grown satisfactorily in West Australia by planting in wide spaced rows with interrow cultivation.

Wider utilization of Harding grass in the United States depends upon the development of sound cultural practice and an appreciation of all the factors necessary for good growth. It is hoped that this grass will prove satisfactory for winter grazing under commercial conditions in northcentral Texas. It is quite possible that it may also prove to be of value in other areas beyond the limits of the blacklands.

This experimental pasture of Harding grass, planted in February 1957, gave a grazing yield of two hundred and thirty-seven pounds of beef per acre, one hundred and eighty-one grazing days per acre, and an average gain of 1.30 pounds per steer per day for the 1957-58 season.

HOLLY
in the Landscape

By Albert S. Beecher

Based on Paper presented by Albert S. Beecher at the twenty-fifth semi-annual meeting of the Holly Society of America at Richmond, Virginia, November 1958.

THE USE OF HOLLIES in landscaping has grown at a phenomenal rate in recent years. Many landscape nurserymen and landscape architects are using hollies extensively in plantings around public buildings, offices, shopping centers and industrial plants. Hollies are popular in home landscaping now that home owners are becoming better acquainted with the landscape possibilities of the various hollies.

Until recent years, the average home owner was acquainted with only the native holly, *Ilex opaca,* and usually associated it with Christmas decorations rather than as a plant that might be used in landscape work.

A major factor in the increasing popularity of hollies can be attributed to the fine qualities that can be found in this group of plants — such varying characteristics as attractive foliage, colorful fruit, different sizes, shapes and rates of growth. They are also versatile as far as their landscape use is concerned — suitable for hedges, barriers, and screens, foundation plantings, groundcovers, and for shade areas — and many are oustanding as specimen or accent plants in a garden. Hollies may also be used in topiary art as a garden feature. In short, hollies fit well into the palette of plants available for landscape work whether it be a small home, public building, park or roadside.

Actually, the use of hollies in American gardens is not a recent development. Some forms have been available since early colonial days when the settlers found American holly *(Ilex opaca),* yaupon holly *(Ilex vomitoria)* and dahoon holly *(Ilex cassine)*. The gardens of Mt. Vernon and Colonial Williamsburg are evidence of their use. From the colonial period until recent years, however, no great use was made of hollies. Though many exotic species were introduced, they were little known except to scattered groups of horticulturists, plant collectors, nurserymen and arboretum directors. And now this sudden interest in hollies has developed.

Are there dangers ahead in hollies becoming too popular and too readily available? They are now obtainable in many chain stores, department stores and in nursery and garden centers. This is the age of "Charge it" and "Do it yourself." Does the person who carries home an *Ilex cornuta* or an *Ilex aquifolium* have enough knowledge of the potential size or capabilities of these plants to locate them properly in order to create in the years to come an interesting composition in the home landscape? Indiscriminate plantings of hollies, especially in the foundation plantings, without proper thought to the principles of planting design may produce a situation similar to the era of arborvitaes. Arborvitaes and other conifers lost favor because most people did not realize their potentialities, and too many homes looked alike.

Holly enthusiasts must be careful not to become so excited about some of the new hollies that they end up in possessing primarily a garden collection of plants lacking in an over-all design. For those who are interested in a collection or in trying out or in observing the characteristics of new hollies, a separate planting area might be advisable.

The keynote to successful landscaping is good design. If full benefit is to be made of these beautiful hollies, they must be skillfully blended into a pleasing composition.

Let us first consider the outdoor living area. When I speak of the outdoor living area, I am thinking not only of that portion of the property that is set aside for outdoor entertainment, family relaxation, and recreation, but I am also thinking of it as an area visible from the living room or dining room and providing year-round aesthetic enjoyment. The outdoor living area is an extension of the indoor living space. Many modern homes with their predominance of glass offer excellent opportunities for the architect and landscape architect to blend these spaces together. Older homes can often develop a better transition by adding a door to the living room or dining room that will permit easy access from the indoor to the outdoor living area.

The living area should have a good overall design. All the parts of this area should blend together to form a pleasing picture that meets the landscape principles of unity, variety, harmony, balance and proportion.

In working up the over-all design, it is well to keep in mind the requirements of the outdoor living area. Enclosure, year-round interest, enframement, accent and creating a liveable area will be discussed.

ENCLOSURE. Living areas or small garden areas need to be enclosed for privacy. Hollies are suitable for screening or enclosing and may be developed as hedges or used in border plantings. These border plantings may be made up of shrubs or may consist of a combination of trees and shrubs. Trees are often needed in the border planting to give scale to the over-all development. However, the type of plants to be selected will depend on many factors. A set of specifications needs to be prepared for each tree and shrub mass on the paper plan. These specifications include height, width, shape, texture and specific characteristics as year-round foliage or fruit. Once the specifications have been determined, it is then much easier to refer to plant lists and to select plants that will fulfill the specifications.

Most of the hollies respond well to pruning and shearing and in habit are compact and dense which makes them fine for hedge plants, if a dense medium or tall hedge is desired. *Ilex opaca, I. cornuta, I. aquifolium* and *I. vomitoria* are good choices.

Another way to enclose the area without having a clipped hedge is to combine hollies with other plants, using the hollies as background. A border of this type might be done with low, medium and tall forms such as *Ilex crenata* 'Helleri' followed by *I. crenata, I. cornuta,* and finally working up to taller masses with one or two of the tree forms of hollies. Since this combination would be predominantly green except for the color furnished by the fruiting forms, other plants could be massed in front. Bulbs, chrysanthemums, small flowering shrubs such as *Pieris, Mahonia* and azaleas would be examples of plants for mass color effects. Select plants that would be of inter st at different periods.

YEAR-ROUND INTEREST. A living area needs to have year-round interest

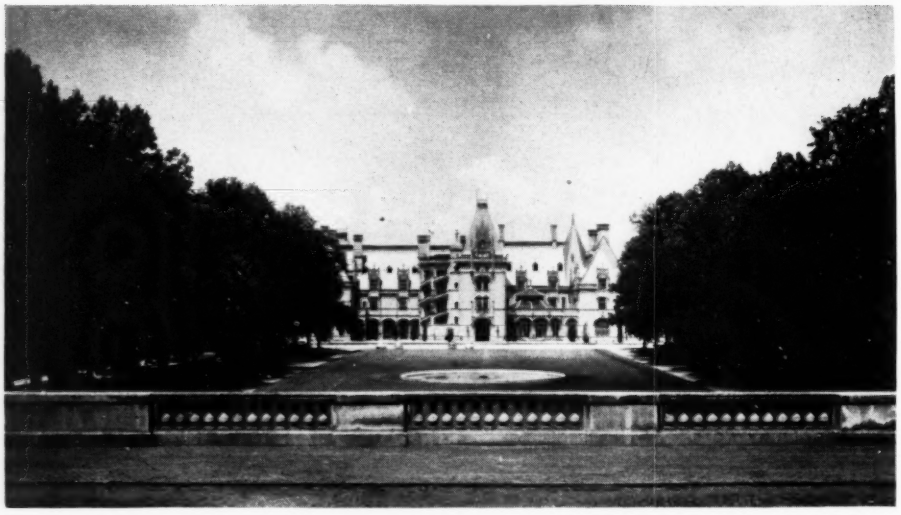
(Continued on page 71)

BILTMORE HOUSE
and
ITS GARDENS

By Fred J. Nisbet

The Library terrace commands a view which sweeps to the beginnings of the Great Smokies.

Biltmore House at the end of the eight hundred-foot Esplanade as viewed from the *Rampe Douce*



THE LATE DECADES of the last century were expansive ones for America. We were filling out our "Manifest Destiny" and flexing our muscles. We had been considered "under dogs" too long. This was the time to prove that America had come of age. We lived and built on a tremendous scale.

It was then that we entered a period of "conspicuous consumption" on the part of some of our more prominent citizens. Unfortunately, some of this was in the tradition of "Diamond Jim" Brady and "Death Valley" Scotty. Such tasteless extravagance created a tinselled legend—period.

Less conspicuous, but more tasteful, manifestations of the period were numerous, even if less publicized. Few of them, unfortunately, were lasting.

Possibly unique among these manifestations of a vanished era is the Biltmore Estate, near Asheville, North Carolina. It was built by George Vanderbilt to be the "finest home in America." There are many who feel that he achieved his goal.

The setting is one of the finest that can be imagined. Range on range of the famed mountains of western North Carolina form an incomparable vista. Magnificent forests clothe the hillsides and surround the scattered farm clearings. The climate is equally fine for men and plants; mild in winter, warm, but with cool nights, in summer. Rainfall is generous and wonderfully distributed throughout the year.

In such a "paradise" it would seem that the building of a fine home with gardens, farms and forests would be a relatively simple task.

The actual undertaking, however, was far from easy. When Mr. Vanderbilt first saw the site, about 1888, the near view was quite a different matter from the broad vistas.

The land east of the French Broad River, where the house, gardens, and most of the farms were to be located, was a depressing collection of worn-out farms. The top soil had long since gone down the streams. The woods had been cut over so many times that all that remained on many of the acres were either weed or defective trees. Yet with a sure imagination (that prime ingredient of fine gardens) Mr. Vanderbilt started his project.

First he set his agents to purchasing the land. For designers he selected Richard Hunt, the fashionable architect from New York, for the buildings and Frederick Law Olmsted, Senior, for the landscape.

Construction began in December, 1889, and was completed in October, 1895. Some of the statistics seem overwhelming. The total extent of the Estate finally increased to one hundred and ninety square miles (one hundred and twenty-five thousand acres), crossing three counties. One thousand men worked on the house and gardens for the full five years. A railroad was built from Asheville to carry the Indiana limestone, Georgia marble, and other materials to the site. When construction was completed, this was removed. The foundations from the stables to the end of the swimming pool terrace are seven hundred and eighty feet long and from the front to the back of the house, one hundred and fifty feet.

Biltmore House is, basically, French Renaissance in style, with some of the inspiration coming from the chateaux at Blois and Chambord. Possibly the finest architectural feature is the spiral staircase based on that at Blois. Most impressive is the Banquetting Hall with its arched ceiling soaring seventy-five feet above the floor.

During part of the construction period, Mr. Vanderbilt traveled widely, assembling furnishings for his home. Fine tapestries, books, furniture, prints, bronzes and other art objects which fill Biltmore House now are a result of these travels.

The gardens were based, primarily, on Vaux-Le-Vicomte at Melun. They bear, however, the stamp of Mr. Olmsted. They are undoubtedly finest in those portions where he gave full rein to his unquestioned mastery of "naturalistic" design. The major garden areas extend over several miles of the Estate.

First is the Approach Road, climbing leisurely in pleasant curves more than three miles from the Lodge Gate to Biltmore House. The plantings contain thousands of native rhododendrons, kalmia, many hollies including huge *Ilex crenata,* magnolias and magnificent conifers including both *Tsuga canadensis* and *T. caroliniana.* White pines are found as specimens and in groves.

The House sits at the end of the eight-hundred-foot Esplanade, with double rows of tulip-trees on each side. At the opposite end is the *Rampe Douce,* affording easy access to the eight-hundred-foot Vista above. Here the double flanking rows of *Tilia cordata* are in rather sad shape. They have been interplanted with male ginkgos, and as these gain considerable size the lindens will be removed.

It is amusing that deer habitually graze here in the late afternoon, within easy bow-shot of the Belvedere with its statue of "Diana the Huntress" and her hounds.

Most visitors spend an hour or more in Biltmore House, but as our interest is in the gardens we shall pass along. Just south of the Library is a large terrace canopied with ancient wisteria and trumpet-creeper. This overlooks the Bowling Green with its box-enclosed swimming pool. Looking out over Deer Park, we see the whole vast establishment dominated by the finest vista of all, range on range of mountains to the south and west, ending in the beginnings of the Great Smokies. Mount Pisgah, in the third range, was once included in the estate. It dominates the whole panorama.

To the east lies the strictly formal Italian Garden with its three pools and most unusual hedge composed of *Ilex opaca* and *Tsuga canadensis.*

Taking the steps to the south we enter the Shrub Garden through the wisteria-covered pergola. Here are fine hollies, dogwoods, Japanese maples and a wide variety of deciduous shrubs. The whole is dominated by a remarkably large and colorful purple beech.

The winding paths all lead to the Walled Garden, called "the finest garden of English design in America." On entering, turn about and see the espaliered plants on the north wall. These include magnolias, a fine double dogwood, weeping cherries, flowering crabs, firethorns and flowering quince. The perennial borders start their year with aconites and anemones. As the seasons turn, narcissus, tulips, iris, peonies and chrysanthemums are the center of attention with a great number of "minor plants" playing the supporting roles.

The beds in the upper section are devoted to bedding plants, but on the lower level is to be found the Rose Garden, with the newly instituted test section usurping the beds under the wall which were formerly devoted to chrysanthemums. Still flourishing on old-fashioned but attractive wire forms are some fine ramblers, probably remainders of a collection of the fine varieties hybridized by M. H. Walsh of Woods Hole, Massachusetts, in the early part of the century.

The main staircase was patterned on the one at Chateau Blois. The chandelier extends the full four floors to the roof.

The Banquetting Hall displays magnificent tapestries under its hugh vaulted roof.

The conservatory and greenhouses at the lower end of this area were designed to complete the garden picture, to keep the massive scale. It was necessary, therefore, when extensive rebuilding was undertaken last year, to follow the original lines. The materials, however, are the most modern aluminum and wide glass. Here flowering and foliage plants are produced for Biltmore House and for bedding in the Walled Garden. In addition, two new collections have recently been started. In orchids, the east wing of the conservatory will house the major show, but the "deep down" gardener will be interested in the "L" of the west greenhouse which is now equipped for the growing of orchids from seed.

With the wonderfully cooperative help of Robert Stone, of Marion, Massachusetts, we are also bringing together a collection of acacias. Within a few years this should be a feature of this area of the gardens.

The next area focuses the spotlight on our finest collection and thus on a man who is remembered both as a first-rate plantsman and as an exemplary gentleman. Although it was Mr. Olmsted who designed the gardens, almost as much credit for their development belongs to Chauncy Delos Beadle. As a young graduate of Cornell University, Canadian-born Chauncy Beadle arrived on Biltmore Estate in 1891 as an employee of Mr. Olmsted. He was working on Estate affairs when he died in 1950. In the intervening years he made Biltmore Gardens, and himself, internationally known in the close-knit circle of plantsmen.

The Azalea Garden is literally and figuratively a memorial to Mr. Beadle. After decades of searching the Southeast for fine and rare plants, he decided that the azaleas of the region, especially *Rhododendron calendulaceum,* were the finest plants America had given the gardens of the world. He was fascinated by the diversity of these colorful shrubs and, as a systematic botanist, puzzled by the tremendous number of natural hybrids. In the late 1930's he set out to collect as wide a variety of these as was possible. The native plants in the Chauncy Beadle Azalea Garden are the result of this search; collected from New Hampshire to Florida and from Michigan to Texas. They represent the only complete collection of native American azaleas in the world.

In addition, there are a considerable number of Asiatic kinds and hybrids in the garden, so that there are about forty-thousand plants in all.

As the soil and climate are so perfectly suited to the needs of hollies and rhododendrons, they do wonderfully here. Because of this, and because of the avid interest in horticulture shared by the two grandsons of Mr. Vanderbilt, two new programs have been initiated recently. These are major collections of these two genera. It is expected that twenty years will be required for their formation.

A nursery has been developed in which material can be grown to "landscape size." Preliminary work for the rhododendron and holly gardens is now under way. It is felt that Biltmore Gardens can serve the Southeast in being a testing station for these plant materials which are so wonderfully adapted but, to date, so little known here.

Biltmore Estate is internationally known in yet another field. Scientific forestry was just beginning in America when the Estate was being formed. Mr. Vanderbilt was enthusiastic about the subject. As a result he brought in Gifford Pinchot to develop a comprehensive plan of reforestation and experimental plantings. This was the first such plan developed in the Western Hemisphere. By 1891 the Secretary of Agriculture in Washington noted that "Mr. Vanderbilt is employing more men and is devoting a larger budget to his experiments in forestry than I have at my disposal for the whole field of agriculture."

As Mr. Pinchot was consulting on many other important projects, it was

The Palm Court is ever a cheerful spot but never more so than on a chilly winter day.

The pools of the Italian Garden mirror the south facade of Biltmore House.

necessary to have a resident forester. The man selected was Dr. Carl Schenk of the University of Darmstadt. During the next twenty years his influence on the development of forestry in America became increasingly important. Much of the basic philosophy of the "land use" concept of conservation and forest operations was worked out by Dr. Schenk in his work here.

Possibly even more important was his founding of the Biltmore School of Forestry. Here he gave thorough training to scores of young men who went out to spread his theories and practical knowledge to all parts of the country. In this way his enthusiasm, and severely demanding discipline, became a wide-spread yeast in the rapidly-growing field.

The influence of Biltmore Estate on farming has been less far-reaching, but it is still substantial. At first, exploratory work was done in almost all areas of agriculture, making the farms virtually an experimental station. All promising new ideas were tried and ever finer animals were brought in to improve the breeds. Jersey cattle were imported from their home island. A truck farm produced vegetables for the Asheville market, and soon milk was being delivered to the fine hotels as well. The basic idea was to determine which crops and methods were best suited to the area. As this information became available, Mr. Vanderbilt hoped to improve the lot of the neighboring farmers.

Of all the farming operations thus begun, only one now remains, the Biltmore Dairy Farms. This is just as Mr. Vanderbilt would have wished. This operation, judged the best adapted to the area, now occupies some thirty-five hundred acres. The latest techniques and equipment are tried and evaluated. Those which are practical are fitted into the over-all picture.

The herd now numbers about fifteen hundred purebred Jerseys, the finest and about the largest dairy herd in the world. The new Biltmore Dairy Plant in the village of Biltmore is the nerve center of a multi-state distributing system. Here milk from the herd on the Estate plus the production of some seven hundred specially selected farms is bottled or processed.

Thus the basis idea of improving the farming and the economic well-being of surrounding farms has been fulfilled.

One other division of the Estate is worth more than passing notice. The original Olmsted plans called for many fine, often rare, plants. At that time, there were few nurseries carrying more than a few of the commoner shrubs and trees. It was necessary, then, to establish a nursery to raise these specified plants in sufficient numbers.

After the grounds were planted, the nursery continued to produce large quantities of fine plants. A series of catalogs of various specialties was published and the business flourished. Then came the still-remembered flood of 1916; the whole area was destroyed and operations were never resumed.

The Biltmore Estate even now, with only twelve thousand acres remaining, surprises one with the huge scale of its conception. The "finest home in America"? Possibly. At the very least, a lasting monument to a vanished way of life.

The way has vanished, but Biltmore remains, to charm thousands each year.

BEGONIAS **(from page 52)**

From the Orient comes another gorgeous species, which is also difficult to grow in the house. This is *B. goegoensis,* also called 'Fire King,' which was introduced from Sumatra in 1882. This bears no resemblance to any other begonia in this group, as it has large egg-shaped, peltate, olive-green leaves which are puckered and blistered with prominent network of veins over the entire leaf. The maroon-red coloring under the leaves gives it a bronzy dark appearance. *B. goegoensis* is very large and considered a collector's item.

To Be Continued

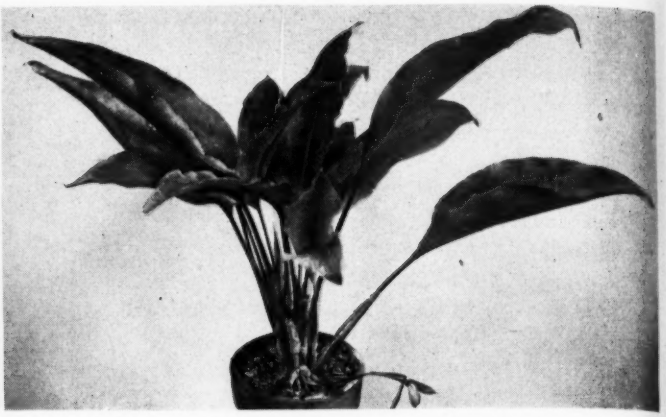
FRONT COVER ILLUSTRATION

From the collection of the late Edwin De T. Bechtel's Daumier material, taken from proof-state lithographs at the Bibliothéque Nationale, Paris, and produced through the kindness of Mrs. Bechtel.

It is from the series, "The Pleasures of Life in the Country," and is captioned: "As for me, I've been feeling like a real creator ...Here let me look at this tree. It's a cherry on which, last year, I grafted an apple... I'm anxious to see what it will give me this year.

"Well, of course! Already I see some caterpillars!"

Polygonum campanulatum



Orchidantha maxillarioides

PLANTS FROM GREAT BRITAIN

By T. H. Everett

THIS IS A CONTINUATION of the discussion that appeared in the January-February, 1959, issue of The Garden Journal of The New York Botanical Garden concerning plants brought back by me in 1952, from Great Britain.

Polygonum campanulatum is a very pretty member of a genus that includes a rather high percentage of distinctly weedy species and of species that are too rampant and ground-annexing to be welcome in most gardens. It does not have these faults. A native of the Himalayas, *Polygonum campanulatum* sends up from a stoloniferous base many stems to a height of two or three feet and in summer and fall covers itself with a froth of small pale pink flowers that produce a quite splendid effect. Its neat leaves are usually blotched with purple along their mid-veins.

This species is suitable for planting in beds, borders and in naturalistic groupings and thrives best in deep, fairly moist soil in light shade. It is easily propagated by cuttings and division. *Polygonum campanulatum* was given an award of merit by the Royal Horticultural Society in 1920.

Orchidantha maxillarioides is a native of Malaya that so closely resembles an orchid in gross appearance that both the generic name (*Orchidantha* — orchid flower) and the specific epithet (*maxillarioides* — resembling a maxillaria) applied to it refer to this. Yet orchidantha is not an orchid; it is a banana relative and hence belongs in the botanical family Musaceae. This plant has a compact creeping root-stock from which arise leathery leaves, seven to nine inches long, of a pleasing green color and somewhat resembling those of an aspidistra. The flowers are in

Below. *Cyperus diffusus*

Right. Begonias 'L. R. Russell' and 'Axel Lange'

Viburnum tomentosum var. 'Lanarth'

pairs in loose panicles much shorter than the leaves. Each well-developed bloom measures two inches or more across. The three calyx lobes are purplish violet tipped with green. The petal that forms the lip of the flower is large, broader than the calyx lobes, and is green with purple markings. The other two petals are much smaller and purplish violet.

Orchidantha maxillarioides is suitable for growing in pots of rich soil in tropical greenhouses and terrariums and would, perhaps, be adapted for outdoor cultivation in southern Florida. It is propagated by division.

Cyperus diffusus, the dwarf umbrella plant, in the form I brought back from England, is more compact and sturdy in appearance than its better-known relative *Cyperus alternifolius* and hence, for many locations, is a better house plant. It requires a rich, moist soil and, during the time of the year when houses and greenhouses are heated artificially, a temperature range of 50° to 70°. It is readily propagated by division and by cuttings made of its leaves. It thrives in shade or sun and prospers when the soil in which its roots grow is submerged or partly submerged in water. It is a tropical swamp and waterside species. Botanical descriptions refer to this plant attaining a height of three feet, but this is certainly not true of the form discussed here which does not exceed a foot in height.

Pilea Cadieri

Begonia 'Axel Lange' and Begonia 'L. R. Russell' are two fine foliage varieties that I succeeded in introducing to American collections as a result of my 1952 trip to Great Britain. These kinds were raised in Belgium shortly before World War II and are complex hybrids of begonia rex-cultorum and taller-growing fibrous-rooted kinds. These begonias have foliage as attractively marked as many of the rex-cultorum varieties, yet have tall, erect stems. They hold their foliage and continue to grow through the winter, features that are not possessed generally by rex-cultorum varieties.

Begonia 'Axel Lange' has untoothed, broad-oval leaves, the upper surfaces of which are medium bronze that pales towards the margins and is clearly spotted with silver-gray. On their undersides the leaves are brilliant red-brown. Begonia 'L. R. Russell' has broad-oval leaves that are more attenuate at their tips and have a few coarse teeth along their margins. They are dark green with bronze veinings, and the upper surface is conspicuously marked with silver tinged with pink.

Both of these begonias thrive in well-drained pots of rich humusy soil in a temperature of 55° to 70°, where the atmosphere is humid and shade is provided from direct strong sun. They are easily propagated by leafy stem cuttings and from single leaf cuttings.

Salvia officinalis variety tricolor is, at its best, a very handsome variegated-leaved form of the common sage that has not behaved as well as it should under cultivation at The New York Botanical Garden. True, the plant has grown satisfactorily, propagates easily and seems perfectly hardy. The trouble is that under our conditions it has failed to retain the beautiful leaf variegation that characterized the specimens I saw in Great Britain and were typical of the ones I brought to New York for some time after their arrival. The variegation has not disappeared entirely; it shows up sporadically on a few shoots, and plants propagated from these retain their pretty marking for some weeks or months. But gradually the variegation disappears more or less and new leaves

Sedum maximum var. *atropurpureum*

Salvia officinalis var. *tricolor*

Right. *Piper Futokadsura*

seem to show little or none, although they are a much more purple in hue than those of typical *Salvia officinalis*. I am inclined to the belief that some soil condition, possibly excessive acidity, is responsible for the loss of variegation, but that is speculation rather than the result of any testing.

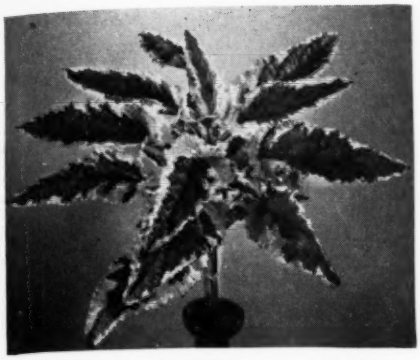
When at its best, the leaves of this plant (they are slightly smaller than those of the common sage, *Salvia officinalis*) are of a rich purple-green color, conspicuously patched and blotched with creamy white and pink.

Piper Futokadsura, the Japanese pepper, is the hardiest of the true pepper vines and closely resembles *P. nigrum* from which the condiment pepper is prepared. The picture presented here does not do full justice to a fine foliage subject; it was taken of a young specimen before it had branched much, filled out and attained its full beauty. This plant has smooth, ovate-lanceolate, slender pointed, rich green leaves that measure about three inches across. When it is grown in a pot and not staked, the branches hang; when given an opportunity to climb against a suitable support, the plant does so by means of aerial roots.

In the milder parts of North America this plant should prove to be a welcome hardy outdoor vine. It grows to a height of about twenty feet. *Piper Futokadsura* propagates very readily from cuttings and seems well satisfied with any ordinary potting soil. It thrives without direct sun in indoor temperatures of from 45° to 70°. The soil in which it is grown should be kept always moderately moist.

Fragraria vesca variety variegata is a very handsome strawberry plant that is grown primarily for the beauty of its foliage, which is most pleasingly marked with creamy white. This kind is exceedingly rare and seems not to be mentioned in botanical or horticultural literature, at least not in the many encyclopedias, dictionaries and other books pertaining to these subjects that I have consulted. In E. A. Bowles MY GARDEN IN SPRING the author refers to "A handsomely variegated strawberry which bears large white fruits..." The

Fragaria vesca var. *variegata*



Scrophularia nodosa var. *variegata*

specimens I brought to America in 1952 actually came from Mr. Bowles' garden, indeed they were given to me by the old gentleman himself, who at the time spoke highly of the variety as a decorative plant. But the plants I received from Mr. Bowles bear small red fruits, not large white ones. It is just possible that Mr. Bowles made an error when preparing copy for his book or, possibly, he acquired two variegated forms in his extensive plant collections.

This variegated strawberry requires the same culture as ordinary strawberries. It is useful in herb gardens and seems to thrive where it receives a little shade.

very easily by cuttings, and within a year or two it is expected that a distribution of young plants of this very excellent shrub will be made to members of The New York Botanical Garden.

Virburnum tomentosum variety 'Lanarth' needs a soil that is well-drained but at no time deficient in moisture; it does not thrive in dry locations. It grows well in sun or light shade. The inner flowers of each inflorescence are tiny and fertile and creamy white; a row of showy pure white sterile flowers forms the perimeter of each inflorescence. Our picture shows a very young pot-grown specimen blooming; neither its foliage nor blooms are as big as normal. This variety, rasied by Lionel de Rothschild at Exbury, received an Award of Merit from The Royal Horticultural Society.

Pilea Cadieri is now common in America. It is a very fine foliage house plant, much used in planters and dish gardens. At about the time I introduced it, other importations of it were made to the American trade. *P. Cadieri* forms an attractive, bushy specimen about a foot high. Its rich green leaves are conspicuously blotched with silver, an effect which results from the epidermis being raised from the underlying tissue by pockets of air, or, as it were, blisters, rather than from lack of chlorophyll. Because there is no lack of chlorophyll, the plant is not a weak grower as are so many variegated plants. The flowers are borne in small tight rounded heads and are creamy white.

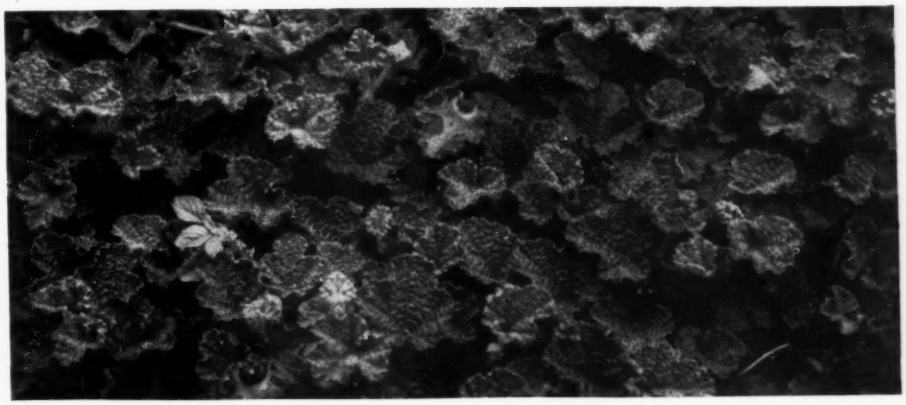
This pilea, to which have been given the names watermelon pilea and aluminum plant, was discovered in Annam (near Indochina) by the French missionary Cadier in 1938. Specimens were sent to Paris and thence to Denmark and on to England.

Cynoglossum nervosum

Left. *Callopsis Volkensii*

Below. *Rubus Fockeanus*

Viburnum tomentosum variety Lanarth, as I saw it growing in an Irish garden, formed a spreading shrub not more than three feet high and several feet in diameter. It bloomed freely and had flowers similar to those of the normal, ten-or twelve-foot-high *Viburnum tomentosum* that grows so well in American gardens. Since its arrival at New York it has been propagated



The watermelon pilea is very easily propagated by cuttings and by single leaves. It thrives under the conditions that suit begonias.

Sedum maximum variety atropurpureum is an old-time plant that had become rare in gardens, especially in its more desirable forms (some are less highly colored than others). I was fortunate in securing an especially good one. This plant grows as easily as the popular *Sedum spectabile* and blooms in fall. It forms a bushy specimen, two to two and a half feet high and has deep maroon-purple stems and leaves which are attractive from spring to frost. Its tiny pinkish flowers are carried in broad, billowy, more or less flat-topped heads. As a cut flower this kind will appeal to flower arrangers as something quite different. It may be combined with yellows and pinks to good advantage and looks especially well when used in copper containers.

Like most sedums this one offers no difficulty to the gardener. A porous soil and full sun are all that are needed. Propagation is by division, cuttings and leaf cuttings. I understand that Bristol Nurseries, Bristol, Connecticut, are offering this variety for the first time this year under the name of mahogany plant; I have heard of other nurseries that are also working up large stocks.

Cynoglossum nervosum is a very fine blue-flowered perennial that is a native of the Himalayas. It blooms in early summer at the same time as *Potentilla Warreni,* which makes a good neighbor plant for it. In general appearance it somewhat resembles an anchusa, being rough-hairy and having a large rosette-like mass of leaves at the base. *C. nervosum* attains a height of two or two and a half feet. Its flowers, almost half an inch in diameter and a deep cobalt-blue, are borne in many-flowered panicles.

This very fine species grows well in any ordinary garden soil in full sun. It is easily propagated by division, root cuttings and by seeds.

Scrophularia nodosa variety variegata is a very handsome variegated-leaved plant that is attractive when grown as a pot plant or out-of-doors where it is hardy. At The New York Botanical Garden it has failed to live over winter outdoors, although it will do so in slightly milder climates. This kind grows easily from cuttings and thrives in any soil that is not excessively dry. It flourishes in sun or light shade.

Attaining a height of two to three feet this scrophularia has erect stems and opposite, toothed, rugose leaves that are banded along their margins with creamy white. The tiny flowers are brownish, borne in terminal cymes and are of no significance from a decorative point of view.

Callopsis Volkensii is an extremely rare and pretty tropical aroid that is not likely to be grown except in botanic gardens and by collectors of choice plants. It is a native of Tanganyika in eastern Africa and is the only known species of its genus. This plant has a short, branching, underground rootstock from which arise crowded, heart-shaped leaves with blades four or five inches long, leathery and conspicuously veined. The flowers, which are borne at various time through the year resemble miniature calla lilies. Each has a pure white spathe measuring slightly more than an inch long and a bright yellow central column or spadix.

A humid, tropical greenhouse, shaded from bright sun, affords the needed environment for this plant. Because it is epiphytic or semi-epiphytic, it succeeds best when grown in composts of the types that are used for the cultivation of epiphytic orchids and bromeliads. In ordinary soils it is not likely to thrive or even persist. The rooting medium should be kept evenly moist at all times. Propagation is by division.

Rubus Fockeanus is a rare Himalayan plant that rather surprisingly has proved hardy outdoors at The New York Botanical Garden. Under these conditions it has been deciduous, but when grown in milder climates and indoors it is evergreen. *Rubus Fockeanus* is a very neat, trailing groundcover with inch-wide, rugose green leaves that form an interesting pattern of good texture. Its stems root into the ground. In addition to its usefulness as a groundcover outdoors, it also makes a pretty house plant when grown in a pot.

This species thrives in full sun in any reasonably good soil that is not too dry. It is easily propagated by division and by cuttings.

BEAUTY AND THE BOAST (from page 49)

suction can be outfitted much as is a vacuum cleaner, with sacks or cages for collecting clippings.

Should Jim collect his clippings? There are advocates yes and advocates no. If the clippings are long from infrequent mowing, fail to settle down out of sight, the lawn will look more attractive with them removed. But if one has a wee bit o' Scotch blood, he'll let 'em lie. Why pack plant nutrients into grass through fertilization, only to haul it off the lawn later in clippings. Chemical analysis of clippings shows them to contain about 4-2-3 proportionment of nitrogen-phosphorous-potassium, the major fertilizer ingredients, produced in sufficient quantity during a year to be the equivalent of at least one generous feeding. Moreover, the gums from decaying organic residues act as a soil conditioner. Soils under clippings stay looser, accept water more readily, than do those bare slaked surfaces.

Is watering necessary? Certainly it is one with adequate temperatures for triggering of seed sprout, and must be practised frequently (though of brief duration) to help get a new lawn up. But for a mature lawn there are as many cons as pros. During drought it will be the only means of holding a turf attractively green. It may help cool the soil and grass in the heat of summer. But applied too frequently it may water-log soil, drowning the deeper grass roots which provide grass durability should watering lag. There are also weeds—noticeably crabgrass, clover and bentgrass (where not wanted)—which profit more from watering than the bluegrasses and hence become more serious pests.

There are other considerations, too. Are there appropriate sprinklers on hand and water pressure enough to get a couple of inches of water evenly distributed on the lawn during a span of a few hours? It may take that much water to soak a clay loam six inches or so deep, which, unlike a sandy soil, won't absorb the water quickly. A sandy soil may become saturated much more rapidly, needing perhaps less than an inch of application to fill all pore space.

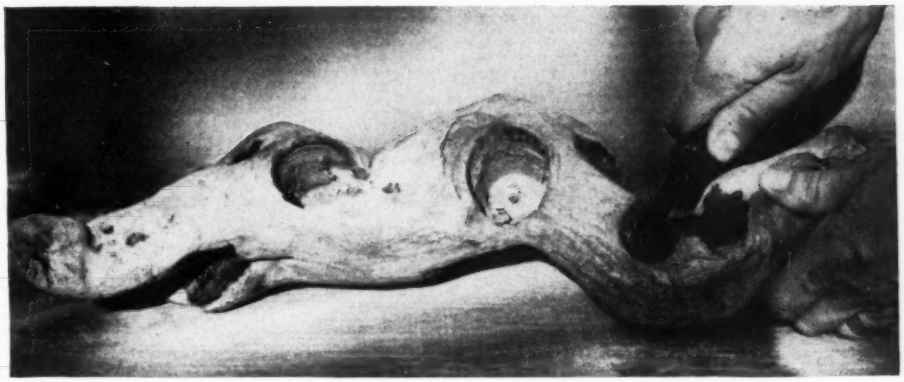
Jim will have many temptations during summer. The garden center will offer numerous miracles, most of which

(Continued on page 67)

DISH GARDENS TERRARIUMS *and* NOVELTY PLANTERS

By Walter Singer

Continued from the Jan.-Feb. Issue



Holes are drilled and carved in a piece of driftwood.

Planting a Terrarium

Now that the functions of a terrarium are known and the choice of glass container has been made, let's start with the actual planting. Round bowls sometimes have imperfections such as air bubbles or streaks; make sure that they do not appear in front, as they may spoil the vision into the terrarium. After this inspection, the proper soil mixture is put into the glass with a trowel or scoop. The soil should be damp but not wet; do not use dry soil for any planting. If the opening is not large enough, make a funnel out of strong paper or thin cardboard; then pour the soil through the funnel on a slant so that the planting level will be on an angle of 30°. This angle should also be maintained with a tank-type terrarium. Planting on an angle makes a terrarium more attractive, since partly looking down on a planting brings out the beauty of the plants more than viewing them horizontally. (This same principle makes sunken gardens and terrace plantings appear more attractive than level ones.)

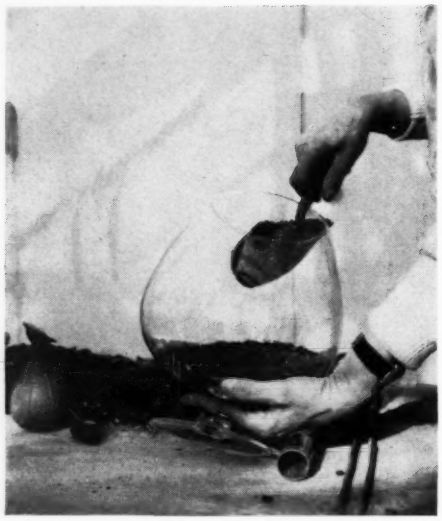
The soil level can be varied a little by creating a rolling contour. Of course, such variations will depend on the imagination of the individual who plants the terrarium. A low, winding groove may be considered a river bed, the higher parts the mountains and so on. Pieces of rock and moss will emphasize such imaginary parts of the landscape. A rustic and naturalistic outline can be made with the help of moss and rock beforehand and later the plants can be carefully inserted in their respective places. Both tank-type and bowl-type terrariums are best planted with a pair of tweezers and a special terrarium dibble. These tools are easily made at home. For the tweezers use split bamboo or two twelve-inch wooden plant labels. The two pieces of split (flat) bamboo — about twelve inches long — are tied together on one end with a wedge between so that the other end spreads apart. There are some plastic tweezers available in camera stores which are intended for use in the dark room. They will do; their only drawback is that they are a little short. The dibble is made of thin brass pipe—one-and-three-quarter-inch or two-inch diameter — and a piece of wood inserted in one end to act as a handle. This piece of pipe, about three to four inches long, is used to make a hole where a plant is to go. After pressing the dibble into the soil, twist it slightly and lift out the soil. The soil must be damp enough to hold together; dry soil will fall out of the pipe-dibble and wet soil is too hard to get out of the dibble. This will leave a hole wide enough for a plant coming out of a two-or two-and-a-quarter-inch pot. Most make-up plants are grown in these size pots. The other end of the pipe-dibble with the wooden handle is tapered down similar to a planting stick and used for pressing the soil firmly around the roots. At times a smaller hole may be more suitable for rooted cuttings or small size plants; for them use a long-handled iced tea spoon.

Holes can be drilled to hold individual plants or carved larger to hold several bromeliads.

Planting a dish with cacti can be made less painful with a pair of tweezers and a long-handled spoon. In this way contact with the spines is avoided.

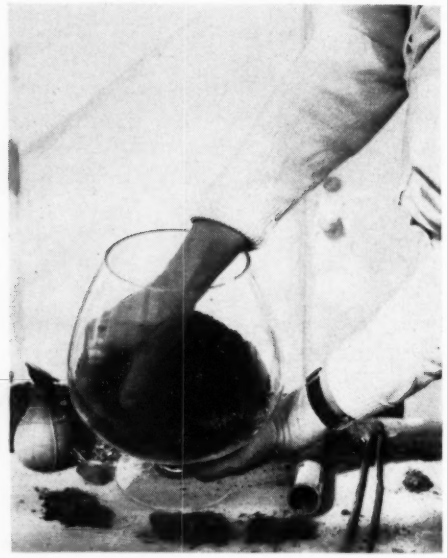
Work on a terrarium is made easier when the terrarium is tipped so that the back of it is towards the one who plants it. This is especially desirable when inserting sand or pebbles which will make the scenery more colorful and interesting. Instead of tipping the spoon with the sand or marble chips, tip the back of the terrarium about 30° forward and bring in the spoon horizontally; this will prevent spilling. The use of colored pebbles or small figurines depends, of course, on individual taste. Small woodland figurines, such as deer or a squirrel, may fit into the picture.

Terrariums can be made up with collected wild flower plants as well as with cultivated tropical plants. Before going into the woods and recklessly plundering or thoughtlessly taking too much, bear in mind that only a small amount of plant material is needed. Do not carry home boxes full of plants, only to learn that most of them have to be thrown away. Above all, obey the



Left. First step: soil is put in brandy snifter with a trowel. If the opening is very small, a funnel will be a better aid. Tilt the glass container slightly toward you.

Below. Second step: the planting area is laid out with clump-moss and thus readied for the next planting step.



conservation laws. Mosses, lichens, ferns, small evergreen seedlings, partridge-berry and wintergreen are fine plants for woodland terrariums with the addition of moss-covered pieces of rock and small pieces of bark or driftwood. Woodland terrariums must be kept quite cool and well ventilated. Watering has to be reduced to a minimum and may not be necessary for weeks at a time.

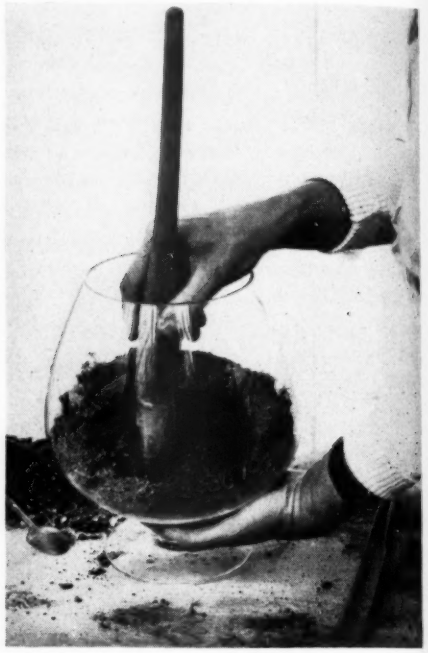
The most rewarding plants for a terrarium are cultivated ferns which are accustomed to a climate similar to our room temperatures. Among these tropical ferns the table-ferns *(Pteris)*, selaginellas and adiantums are the most suitable. As a rule, the cycle of condensation will furnish enough water for some time; however, as the ferns grow larger, they may need additional watering. Always inspect the soil before watering. When the color of the soil turns grayish, then add water. Do not water dark-colored, damp soil.

Fourth step: plants should be inserted in their respective places with a pair of long tweezers, using the upper end to press the soil firmly around the roots.

Fifth step: watering a terrarium is efficiently done with a laundry rubber-ball sprinkler. Spray the water against the glass walls to reduce the pressure. Applying the water all around the walls assures an even distribution.

The plant material for dish gardens is much more plentiful but choosing the right companions may, therefore, prove a little more difficult. Dish gardens may be classified under different groups. For the sunny south window a cactus or succulent planter is the right choice, while for a western or north window an arrangement with colorful foliage plants will be the appropriate selection. Attached is a list of plants with specifications as to their fitness in a terrarium or dish garden and their need for sun or shade. The more one learns about the natural habits of growth, the more possibilities will be revealed as to how and what to use for respective planters. As was mentioned previously, work with dish gardens and terrariums has hardly been touched. The commercial man looks for the quickest and easiest way of making up a beautiful picture planting which will bring him a good profit. It is up to the plant lover and amateur gardener to explore the unknown and to discover the pleasant surprises which are so rewarding.

Third step: holes for planting are made with a pipe dibble which lifts out just enough soil to hold a pot-grown plant.



Plants for Terrariums, Dish Gardens and Novelty Planters

It is impossible to list all plants suitable for dish gardens, terraria and nov-

elty planters. A selection will depend greatly on individual taste and the availability of plant material. The plants listed below have proven successful in plant arrangements and are among the best-known for such purposes. While rooted cuttings or offsets of certain plants may grow on safely in plant arrangements, it is advisable to obtain plants grown and well established in two or two-and-a-quarter-inch pots for happiest results.

The letters after the plant names indicate: D for dish gardens, T for terrariums, NP for novelty planters, S for sunny location and bright light, DL for diffused light and little shade.

Acorus gramineus and *A. gr. albo-variegatus*	T	D	S		
Aglaonema commutatum	NP	D	DL		
Aglaonema costatum	T	D	NP	DL	
Aglaonema modestum	T	D	NP	DL	
Aglaonema pictum	T	D	NP	DL	
Aglaonema treubii	T	D	NP	DL	
Ardisia crispa (crenulata)	T	D	DL		
Bromeliads. All species and varieties except large-growing ones	T	D	NP	S	
Buxus sempervirens (small boxwood)	T	D	NP	S	
Cacti and succulents. Nearly all species and varieties for special arrangements		D	NP	S	
Chamaeranthemum gaudichaudi	T	DL			
Cordyline terminalis. All varieties of the Ti plant	T	D	S		
Cyrtomium falcatum compactum (dwarf holly fern)	T	DL			
Dieffenbachias as small plants in terraria	T	DL/S			
Dracaena godseffiana	T	D	NP	DL/S	
Dracaena sanderiana	T	D	NP	DL/S	
Episcia cupreata	T	DL			
Episcia fulgida and varieties	T	DL			
Euonymus japonicus and all varieties	T	D	S		
Euonymus microphyllus and all varieties	T	D	S		
Euonymus radicans and all varieties	T	S			
Ferns as small plants in terraria	T	DL			
Fatshedera lizei and *F. l. variegata*		D	NP	S	
Ficus nitida		D	S		
Ficus radicans variegata	T	DL/S			
Ficus repens (pumila) variegata	T	DL/S			
Fittonias, all varieties	T	DL			
Hedera helix (small leaf varieties)	T	D	S	NP	
Helxine soleirolii—baby's tears	T	DL/S			
Homalomena wallisii	T	DL			
Hoya carnosa—wax plant and all varieties		D	NP	S	
Ixora coccinea	T	DL			
Lichens and mosses	T	DL			
Ligustrum lucidum—glossy privet	T	D	NP	S	
Malpighia coccigera—tropical dwarf holly	D	S			
Marantas—all small varieties	T	DL			
Myrtus communis and varieties—myrtle	T	D	S		
Neanthe bella (Collinia elegans) dwarf palm	T	D	NP	S	
Osmanthus illicifolius variegatus		D	NP	S	
Peperomias—all species and varieties	T	D	NP	DL/S	
Philodendrons some small leaf varieties and small seedlings of sessile philodendrons	T	D	NP	DL	
Pileas in variety	T	DL			
Piper ornatum	T	NP	DL		
Pittosporum tobira and *P. t. variegata*	T	D	NP	S	
Podocarpus macrophylla	T	D	NP	DL/S	
Polyscias in small growing varieties	T	D	NP	S	
Saxifraga sarmentosa—strawberry begonia	T	DL/S			
Selaginellas	T	DL			
Schefflera actinophylla	T	D	NP	S	
Scindapsus, all species	T	D	NP	DL	
Spathiphyllum floribundum	T	DL			
Stenospermation popayanense and *S. spruceanum*	T	D	NP	DL	
Syngonium podophyllum and varieties	T	D	NP	DL/S	

BEAUTY AND THE BOAST (from page 64)

Jim will not need in order to meet his boast. There will be "vitamins" to keep soil "bugs" happy; wetting agents, to make water wetter, presumably aiding insoak; aerifiers for punching holes in the soil as is done on golf greens; grass "discoveries" to end all troubles (zoysia, fine in the South, was a highly-advertised pet cure-all; more recently "mondo grass," of the lily family, has snared a few unwary Northerners). There will be the gibberellin growth stimulators, which do make the grass get longer more quickly — but, unfortunately, no thicker. And a host of patent medicines for weeds.

There is merit in preventive action, budget and time permitting. General fungicides can help check disease, especially during the cool damp weeks of spring. There are several, formulated of antibiotics, mercurials, or mixtures of cadmium, chromium and similar metal salts.

For insect control chlordane and dieldrin serve all-around purposes, ridding lawns of creeping pests, such as ants, and grass parasites, such as sod webworm or chinch bug. They last many years in the soil, proof against the grubs which so enjoy nibbling roots. Sufficient chlordane in the soil will even stall crabgrass, as will fifteen to twenty-five pounds /M of several arsenicals.

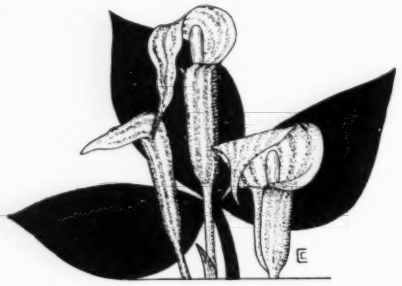
But Jim has his battle nine-tenths won, his boast of beauty in the bag. He planned his strategy perfectly, choosing good grass, then doing the right thing for it at the right time. The old-favorite, proven lawngrasses demand very little attention. If they needed pampering, they wouldn't still be around. A good start in an amply fertilized seedbed, supplementary feeding especially autumn and early spring, the mower set high for bluegrass lawns (one and a half to two inches), and there will be mighty little else to worry about. Having a good lawn isn't half the bother that having a weed patch is!

TREE CARE (from page 46)

declines. Weakness begins to manifest itself in off-color, smaller size leaves, in shortened twig growth, in less plump buds, in reduction of fulsome beauty. Then twigs begin to wither, branches and larger limbs die. Fungi and other disease organisms silently invade both the outside and inside of the tree. Borers and bark beetles come piling in. The chain reaction is well under way, and it leads but to tree death.

Called in before it is too late, the arborist uses every tool and every chemical in his arsenal and all the scientific knowhow at his command to restore an ailing tree to health.

Just how long the road-back-to-health takes depends upon the state of neglect. Tree care is not expensive if done periodically. It is far, far more expensive to remove a mature tree after it dies than to care for it properly for many years. And at the end of that time, the tree remains a thing of beauty.



A Country Housewife's Garden

By **Gertrude B. Foster**

DURING THE early part of the winter, when the temperature dipped below zero for long periods and the ground was not blanketed with snow, farmers around us had trouble with pipes freezing. The fortunate ones had wells in or close by the barn, where the heat from their animals and manure piles helped to keep the frost from penetrating the three-foot depth that it had reached by January 10. One ingenious young man attached plastic pipe to the water outlet in the barn and piped water to the house. He did not wish to leave it running all night to prevent ice from forming in the hose so he visited a neighbor who kept a riding horse and borrowed some manure till spring. With a dressing of horse manure and straw atop the hose, he had no further trouble.

It reminded me of one Garret Clopper who lived near Portland, Maine, and grew watermelons and other melons to maturity by August 31, in 1794, in a horse manure-heated hotbed. Fortunately he kept a very detailed "Gardening and Planting Journal," penned in a firm hand, off and on for twenty-six years. This unpublished manuscript notebook came into my hands through The Gerard Society. From it I have gained a new respect for the remarkable inventiveness of one Yankee farmer growing a veritable garden in four hotbeds, two of which were covered with oiled paper rather than expensive glass. He also used hand glasses over dung-filled trenches to coax his cucumbers and melons through the cold spring days that included frost after the first of June some years.

Transplanting melons, squash, cucumbers and other unlikely subjects for shifting once started, was facilitated by small wooden boxes which he made according to the following design:

"Removed melon plants (green flesh) into bed No. 3 — as I sowed seeds in the hill lest the plants should fail. Note the plants raised in No. 1 (hotbed) in boxes wider at the bottom than at the top. The bottom slightly tacked on, by slipping off the bottom, the plants with the surrounding earth are dropped through the box into holes prepared in the hills without injuring the fibers or roots. . . ."

The Journal was kept daily, some years from March 17 or 21 until August. In other seasons things were so discouraging to the farmer and gardener that there were few entries. He admits his failures as well as his successes. There is one sad note that the hog's dung placed around the newly set broccoli plants to prevent the effects of the maggot did not work. But by replanting Mr. Clopper often managed to outwit the leaf hoppers and other insects which abated after the weather changed or the season progressed.

Of course, in 1794, it was imperative to save your own seed. Cabbages, turnips, carrots, beets and celery were stored in the cellar over winter and set out in spring to go to seed. When a planting of melon failed to come up, the gardener and journalist noted that it was year-old seed. In addition to keeping roots of vegetables indoors over the winter, Garrett Clopper actually planted seeds of carrots, parsnips, onions, shallots and celery in October for a head start the next season. The seed wouldn't germinate until the next spring, but by being in place before the garden was plowed the next season and already moistened by freezing and thawing during the winter, the carrots were an inch in diameter on July 13 and were ready to pull. Mr. Clopper was not only a good gardener but a friend of the cook, picking vegetables when at their young and tender best.

From his notes on operations for early planting, we can get an idea of his methods. In 1794 he described the first two of four hotbeds in considerable detail:

"March 21 — commenced a hotbed for three glass lights — the dung being well mixed by former operations—dug a trench one foot deep (the ground being frozen from 10 inches) and laid in the dung, well mixed and beat down with a fork, to the height of two feet from the bottom of the trench. Had it six inches from the sides of the trench to prevent the chill from the frozen ground — laid on the frame and glasses and a violent fermentation immediately commenced.

"March 24—The fermentation continued—raised the glasses to let out the steam—trod down the bed to continue the heat, and laid one inch of fresh neat's dung and two inches of old ditto — to prevent burning — filled up the space between the sides of the trench and the dung with earth trod in, and banked round the dung and frames with ditto—Note the dung was laid 15 inches without the frames round the bed — 40 large wheelbarrows of dung used.

"March 25—Prepared the earth—⅔ from the surface of an old hot bed well mixed and fine and ⅓ fine sifted loam from a cellar in which cabbages were kept — added to this ⅓ of the whole quantity of old neat's manure well sifted. Put the whole into the bed to dry and burned it over twice a day—the fermentation and heat yet violent and the glasses kept raised to let out the steam—before the earth was put in, I again trod down the surface of the bed equally."

In 1796, Mr. Clopper was preparing hotbeds as he did every year on March 17: "Made a hotbed, 1 foot neat's dung below, 2 feet of horse dung above. The bed heated immediately.

"March 19—Put in the earth prepared last fall, and lying all the winter under the stable dung — raised three hills for cucumbers, and mellons 14 inches thick, covered the residue of the bed 4 inches.

"March 21—The bed in high heat — sowed 2 hills of cucumbers and one of mellons—also—radish, mustard and lettuce for salad."

After making four hotbeds, two of which were covered with oiled paper and two with glass, he described the preparation of trenches for melons and cucumbers to be planted outside under hand glasses.

April 23, 1794, "Employed dunging the garden with old horse dung from hotbeds. Made three small beds for hand glass — two feet deep of dung sunk in a hole and well trod—boarded round to keep in the earth. Peppers and parsley up in the paper frames—(They

(Continued on page 70)

GRAFTING OPPORTUNITIES *with* ORNAMENTAL TREES

By J. C. McDaniel

Condensed from the September 1958 Newsletter of the Illinois Nut Tree Association, edited by J. C. McDaniel, and brought to the attention of readers of The Garden Journal at the special request of the late Clarence Lewis, member of the Board of Managers of The New York Botanical Garden.

ALMOST ALL the hardwood ornamental trees, wild or cultivated, can be bark grafted. Pome and stone fruits, plus persimmon and pawpaw, also are readily budded. Even the evergreen conifers are subjects for amateur top-working, through grafts of leafy shoots covered with plastic bags. If you look for it, sooner or later you are likely to find an improved horticultural form, in the same or a related species, for grafting on almost any young tree that happens to be around. Here are some examples among native and introduced trees in Illinois with which home owners can have fun, and which nurserymen handy with their knives can upgrade among their shade tree and other ornamental woody plant offerings. Arboretums and college campus plantings are initial scion sources for some of the rarer species and selections.

Acer, the maples. The sugar maple and native red maple varieties offer an almost totally neglected field for clonal propagation. Foresters interested in maple sugar production have made certain selections for sweeter or more abundant sap flow. From the ornamental viewpoint, both species include seedlings with quite varied growth habits, rate of growth and autumnal coloration. The red spring color in flowers and fruits of red maples ranges from dark to practically absent. Grafted varieties, easily propagated on seedling stocks of their own species, would be better than the mixed seedling types generally offered. Central-southern Illinois and central Indiana appear to be the home of some particularly robust red maples. In studies reported by the Ohio Experiment Station, southern Illinois was a favored source for sugar maple seeds to produce trees with high survival and vigorous growth in plantations. (Those from Lake areas and eastern mountains were drought susceptible.) Western Kentucky and Tennessee towns have trees of *A. leucoderme,* with shorter growth and smaller seeds than the usual sugar maple *(A. saccharum).* Black maple, *A. nigrum,* is another species of the sugar maple group found in the Midwest and intergrafts with *A. saccharum.* Red maple is dwarfed (sometimes too much) on silver maple stocks.

Aesculus, the buckeyes or horse-chestnuts. Red, pink, orange and white-flowered species and hybrids are available, in large or small tree to shrub sizes, with flowering seasons from early spring to as late as August. As far as known, all are graft-compatible on the common yellow and Ohio buckeyes and European horse-chestnut seedlings. One of the dwarfest species (a suckering shrub) and latest flowering is the handsome bottlebrush buckeye *(A. parviflora),* whose nuts are said to be sweet and edible without bad effects. Plant the seeds of this and the other southeastern shrub-like species, as soon as ripe in September and October; they will germinate in warm soil in two weeks, though sometimes not producing any growth above ground until spring. When dried, all buckeyes lose their viability, so that fall sowing or stratification of fresh seeds is practised.

An Ohio experimenter reports that the double-flowered white horse-chestnut is incompatible on *A. glabra,* but that he double-works it, using the hybrid 'carnea' as an intermediate stock.

Albizzia julibrissin, silk-tree or mimosa-tree. The supposedly hardier form of this species is var. *rosea,* but its seedlings seem just as likely as others to bear flowers of a pale off-white color rather than "rosy." It follows that grafting, budding, or root-cutting propagation should be used to multiply the best-colored and freest-flowering forms. Seedling trees observed in central Illinois and southward have shown considerable variation in amount and duration of flowering. Three clones selected for resistance to the mimosa wilt disease in southern states have been named by the U. S. Department of Agriculture and others, with better flower color, may soon be available. Since the disease is soil-borne, root cuttings furnish the best method of propagating resistant trees where this is a problem. Selected, vegetatively propagated varieties should make this a much more desirable summer-flowering tree at least as far north as Quincy and Peoria. The tree is a fast-growing legume, usually arching widely. Seedlings of 'Charlotte' and 'Tryon' are offered by Tingle Nursery Company in Maryland.

Aralia spinosa, devils-walking-stick or Hercules-club tree. This small, prickly-twigged native tree with big compound leaves, summer flowers and September ripening berries in large clusters, seems to have developed no distinct varieties, though northern collected specimens (as in eastern Iowa) would probably be hardier than those from east Texas or Florida. It belongs to the same family as the true ivy vines and might possibly be grafted to support an ivy bush. Probably more likely to grow well on it is the less prickly Chinese angelica-tree, *A. chinensis.* Still another possibility for trial grafting is the Asiatic tree, *Kalopanax pictus,* whose star-shaped leaves resemble an enlarged version of the sweet gum.

Betula, the birches. *Betula nigra,* the river birch, can be used as an understock for at least some of the many other birch species. Adapted to most upland soils as well as its native sandy stream banks, and thriving in hot summer climates, the river birch has been strangely neglected by most nurseries, but seems now to be one of the most desirable substitutes for the American elm. Its principal weakness is a tendency toward chlorosis on soils with too much lime.

Carpinus, hornbeams and *Ostrya,* hophornbeams. These small to medium-sized ornamental trees, the Illinois native species of which are known by the common names of blue beech and ironwood, respectively, have close relatives from Europe and Asia which are hardy here. The European *C. betulus,* which holds its leaves better than *C. caroliniana,* comes in an upright variety *fastigiata* as well as the more common one with wide-spread branches, a pendulous form and others with leaf variations. The Oriental *C. tschonskii* looks more like an elm in leaf and growth habit and is one of the most handsome and pest-free of the promising replacements for elm on small properties. The Indiana University campus has an *Ostrya virginiana* with semi-pendulous branches, and other interesting growth variants are to be found in the range of the species from Florida and Texas to Manitoba. Squirrels go for the small nut-like seeds in the inflated involucres of

the hophornbeams (after they have first stripped the filberts in the vicinity). In spite of the "blue beech" name, these genera are more closely related to filberts and birches than to the true beech. Each is graftable on the other genus.

Cornus, the dogwoods. At the U. S. National Arboretum, the Pacific dogwood, *C. nuttalli,* which usually is a failure in the East, has recently been budded on seedlings of the common flowering dogwood, *C. florida,* and shows good growth for two years. The western species, in its native habitat, often has a second flowering in the fall. Budding is the usual propagation method for pink and double-flowered varieties of *C. florida.* (Shrubby dogwood species are grown from hardwood cuttings.)

Celtis, the hackberries. *Celtis* is represented in the northern two thirds of Illinois mainly by *C. occidentalis* var. *crassifolia,* the midwestern variety. It is usually more or less disfigured by the witches'-broom condition, which workers in the Illinois Natural History Survey have confirmed is due to the combined action of a mite and a powdery mildew fungus. Several southeastern species (including *C. laevigata* from southern Illinois) and others from China are graft-compatible on *C. occidentalis* and do not seem to get witches'-broom, though most species will share some of the hackberry leaf galls. Two started with grafts at the University of Illinois at Urbana last spring are *C. laevigata* var. *smallii* from Alabama and *C. bungeana,* a Chinese species that does well at Rochester, New York. Another Chinese species, *C. sinensis,* is much planted at Davis, California, and I had grafts of it growing at Nashville, Tennessee, but its hardiness for Illinois is not determined.

Cercis, the redbuds. Grafted varieties of American redbud *(C. canadensis)* have just begun to be used to any considerable extent in Illinois. The Royal Oakes farm at Bluffs was the source of a white-flowered variety now propagated by the Louis Gerardi Nursery. (Other white varieties in propagation originated in Missouri or farther south.) The "whitebud," as some call it, blends more harmoniously than the ordinary pink type with other early spring blossoms in the landscape. Among the pink redbud trees in southern Illinois are some with red color in immature seed pods, another color variation which also is most reliably perpetuated by budding or grafting. (The plate bud method is easy in late summer.) Then there are trees with more upright and sturdy growth than the usual somewhat sprawly redbud, which might be propagated for planting nearer to streets and sidewalks than the ordinary type. A large, upright-branched tree was seen this summer in Elwood, Indiana, where it reproduces partly true to type from seed. Foreign *Cercis* species generally are less hardy, but Chinese and Eurasian redbuds might reward the work of some experimental grafting, at least in southern Illinois.

Crataegus (red-haw, hawthorn), offers grafting possibilities which one person could not exhaust in a lifetime. Besides the hundreds of species and hybrid forms of *Crataegus,* many with ornamental, pomological and wildlife feed value, red haws can be used as good to fair stocks when grafted to many of the other pome fruit relatives, including quince, *Amelanchier, Cotoneaster, Photinia, Sorbus,* and ornamental as well as edible fruited pears. Apples on haw seem generally too much dwarfed, but some varieties may do better than others. Among the haws themselves, species of little ornamental interest can be topworked to others excelling in size of fruit, color, edible quality and disease resistance. In our climate, the native red haws with the greatest culinary value probably belong to *C. mollis,* or downy hawthorn. Their large red fruits ripen and fall so early (August-September) that they do not show conspicuously among the large green leaves. *'Lavallei,'* a hardy hybrid between Mexican hawthorn and cockspur hawthorn, is another large-fruited one, whose conspicuous fruits are said to remain through the winter. The English hawthorn has numerous varieties, including pink and red-flowered ones, and is resistant to rusts, but unless sprayed regularly is defoliated in summer by Fabrea leafspot. 'Toba,' a pink-flowered hybrid, originated at Morden, Manitoba, is hardier and may be more resistant to fungi. Scions taken high in old trees should grow more nearly thornless and come into fruiting sooner, compared with seedlings. As rootstocks for dwarf pear trees, hawthorns can be first worked with *Cotoneaster multiflora,* then with pear on the *Cotoneaster* intermediate stock (interstock). *To be Continued*

HOUSEWIFE'S GARDEN (from page 68)

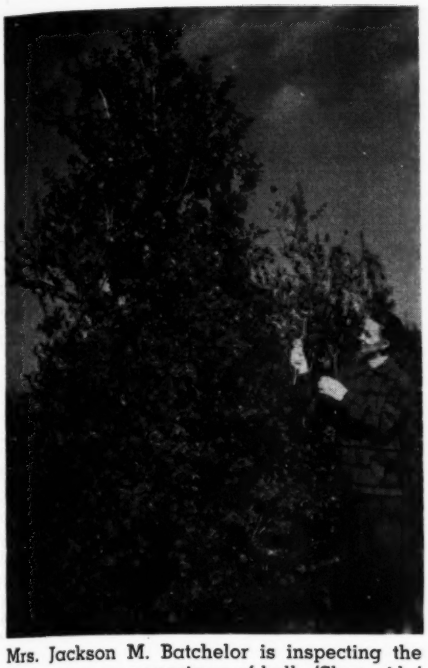
were sowed April 9) The melon plants seem to have taken root—watered the whole." He even transplanted melon seedlings in the hotbeds where they had come up too thickly and filled out gaps in other hills.

The rewards of all this industry were considerable. On April 20, 1794, Mr. Clopper noted that he "pulled a salled of radishes, tongue grass, shives and mustard." This was not the first crop for the season either. On April 9 he had pulled two large "salleds" of mustard. These were from a hotbed commenced March 21 of that year, and seed sown the 29th.

The cucumbers and melons which were planted in hills one foot deep under the center of each glass in the hotbeds remained in place and the sash and frames were lifted off as summer came. However, others were planted in "small boxes (2 in each) placed on the surface of the earth between the cucumber hills." They were set out in the garden when the ice had gone out of the river and danger of frost was past.

Among the herbs which the New England farmer gave an early start in the hotbeds were fennel, rose-geranium, castor bean, sweet marjoram, thyme, gillyflowers, summer savory, parsley, capers (probably caper spurge, the euphorbia grown for seed which was placed in mole runs as a poisonous deterrent to moles) and tongue grass. The last was also called cress by Mr. Clopper so we suspect that it might have been garden cress, *Lepidium sativum,* which gives such a rapid crop of salad greens.

April in Maine could vary from warm and mild in 1794, when Mr. Clopper sowed onion, French turnip, lettuce and radish in the asparagus bed on April 28, to the more trying season of 1796. Though he had been able to sow broccoli, Savoy cabbage and lettuce in the first hotbed on April 9, he noted that on April 12 the melons and cucumbers in the same bed were injured by cold. Mustard and other quick crops were destroyed by the heat and damp of the beds, as he hadn't been able to open the sash to admit air, the weather having been so cold and snowy.



Mrs. Jackson M. Batchelor is inspecting the berry crop on a specimen of holly 'Shangri-la' — U.S. Plant Patent 1749.

'SHANGRI-LA'— *Choice Holly Seedling*

WHEN Jackson M. Batchelor was associated during 1937-1942 with Hilliculture Soil Conservation Service, U.S.D.A., his interest was aroused in hollies. It was one of the Division's objectives "to bring to light and usage those tree and shrub crops which, when grown under suitable ecological and cultural conditions, would provide soil stabilization, supplement the farm income, and retire land from soil-depleting crops such as corn, cotton and tobacco. Hollies, particularly the English, *Ilex aquifolium,* varieties, were being grown commercially in the Pacific Northwest whereas the American holly, *I. opaca,* was being ruthlessly destroyed in the wild. ..." (HANDBOOK OF HOLLIES: special issue of the NATIONAL HORTICULTURAL MAGAZINE, January 1957).

This interest was continued when Mr. Batchelor, landscape architect, holly and blueberry specialist, moved into his new home near Willard, North Carolina, in 1947 and began test planting to determine what varieties were desirable for and would prove profitable in holly orcharding. Over a period of ten years he learned that northern selections of American hollies are not as satisfactory as southern forms; that varieties of the English holly have not proved acceptable to coastal regions of the South; and that seedlings of Chinese hollies appear to be the answer, with *Ilex cornuta* 'Shangri-La' offering the greatest promise. This resulted from a cross which Mr. Batchelor made twenty years ago, named in 1947, and on which he obtained U.S. Plant Patent No. 1749 in 1958.

Ilex cornuta 'Shangri-La' has an upright, symmetrical habit of growth; its leaves are small, finely textured, a glossy rich dark green. It is a heavy producer of large attractive red berries that make it a particularly desirable holly for arrangements and Christmas decorations. The sprays will hold the leaves and berries ten to fourteen days.

This holly is not only excellent for orcharding, but a beautiful long-lived ornamental for home grounds. The three-year-old plants, which are shipped in specially designed gallon containers to assure their healthy condition on arrival, should be planted promptly in full sunlight and in a place where roots of large trees will not conflict. Under proper growing conditions, holly 'Shangri-La' will grow three to six feet in one season. Berries will develop the second or third season after planting.

HOLLY (from page 55)

and dogwoods could be planted with the tree hollies. Hollies are especially important for providing color in the late fall and winter with their fruit. A specimen holly located so that it is in view from the living room or dining room would be especially enjoyable when covered with fruit. Snow on a holly makes another beautiful picture.

Shadows are important in garden design but are overlooked when locating a specimen tree. If properly located, a tree will cast interesting silhouette patterns on the lawn. Hollies have a deep rich green color twelve months a year and are ideal as background for other plants that have interesting bark, flowers or fruit.

In too many living areas it is possible to see the complete picture in one glance from the terrace. A pair of specimen hollies can be spaced far enough apart to hide a portion of the scene and help to develop a hidden area. Hollies are especially effective for this type of development, if the branches are allowed to be full at the base of the trunk of the tree. A feeling of spaciousness will be developed if hollies with a bold texture are used at the opening and hollies with a finer texture are planted in the recessed area.

ENFRAMEMENT. A perennial border in the living area often needs to be framed. Hollies because of their attractive foliage are especially good for this purpose. The front of the perennial border may be strengthened by an edging plant. Ideal for this task are some of the horticultural varieties derived from *Ilex crenata* such as 'Hel-

Heavily berried sprays of holly 'Shangri-la' are effectively arranged in candelabra.

leri,' 'Kingsville' and also 'Kingsville Green Cushion.'

ACCENT PLANTS. Hollies are good to accent the garden gate, pool, beginning of a path, at the top or bottom of steps separating one level from another, or the rock garden.

HOLLIES IN THE FOUNDATION PLANTING. In many areas broadleaf evergreens are being emphasized over conifers in plantings around the foundations of home and public buildings.

Several hollies are suitable for home foundation planting. These may be used alone or in combination with other plants. What plants to select or how to arrange them often puzzle home owners. It is important to keep in mind that the basic purpose of foundation planting is to create an over-all pleasing composition. Think first in terms of tree and shrub masses and how they may be blended together. Take time to visualize how large these trees and shrubs will grow in the years to come. If you know for the best landscape effect the plantings at the corners should be five feet tall, select plants that normally grow about that height or be prepared to start pruning as they approach the preferred height.

In creating this picture, it may be desirable to accent the doorway, soften the lines of the house, tie the various plant groups together as well as to provide shade, framing and a suitable background. Too many vertical forms and too many different kinds of plants are two of the mistakes most frequently made in foundation plantings, and not knowing how or when to prune is responsible for the poor condition of many foundation plantings. For example one may see the beautiful Chinese holly pruned so that the top resembles a ball or an egg-shaped form. Severe pruning also cuts down on the potential fruit display.

The horticultural varieties of *Ilex crenata* and the slower-growing forms of *I. cornuta* and *I. vomitoria* are valuable foundation plants if handled properly. When groundcovers are needed to tie the taller masses together, the low-growing hollies are excellent. Select such low-spreading or compact forms as *I. crenata* 'Helleri' or *I. c. rotundifolia.* Tree forms may be used in the foundation plantings if height is needed for framing or breaking harsh vertical lines.

PUBLIC BUILDINGS

Around churches, schools and colleges, office buildings and industrial buildings, mass effects are often desirable and shrub forms of hollies lend themselves well to such plantings. Tree hollies may be employed with these mass plantings when height or an accent is needed. Away from the buildings hollies are excellent for screening parking areas or for border planting. The tree forms make ideal specimen plants for large lawns.

Greater use will be made of hollies when more park superintendents, nurserymen, landscape designers and others become better acquainted with the different species and horticultural forms.

At the present in the United States a great road building program is going on. Plantings are necessary to help break the monotony of mile after mile of open land. The ground area for an interchange is large. Will these interchange areas be grass only? Will we have super highways without trees?

The answer to these questions depends on how concerned the people of America are in having well-landscaped highways. Garden clubs, plant societies, and individual plant lovers should let their highway engineers know they want good highway landscaping. There are many places for hollies in this road building program.

WORLD FRIENDSHIP (from page 44)

soldiers are lying who sacrificed where sacrifice was needed for the liberty of free world so that various beautiful flowers may comfort souls who defended free world so bravely. And those flowers will be planted at church, children's garden and park scattered in Seoul City, and we will also not fail to breed them in quantities."

The most recent request to be answered by the Garden Club of New Jersey is from the Alexandria Horticulture Society, Alexandria, Egypt, for books on American gardening. The request is being filled through contributions of books from club members, fifty books are already on the way, inscribed "In friendship from American gardeners." The club expects to send as many as two hundred books. Riad Sharoni, chairman of the Educational Committee of the "A. H. S.," writes, "May we desire for the honor to our Horticulture Society to be under your kind care, as one of your family, for help in building our library with the knowledge of America—leading the world in the fine art of gardening. Gardening is the international fine art that joins all hearts with one love—love of nature, the mother of all nations, and all her sons and daughters are brothers and sisters. Americans are the most to understand this spirit. Books on gardening, landscaping, back numbers of garden magazines—will do a magic encourage in helping us."

I do not wish to sentimentalize or exalt the potential of this friendship-through-gardening activity, although for anyone working in it, it is a moving and exhilarating experience. To the donors of these tokens of friendship, there is a disproportionate return in the satisfaction of doing something constructive—an outlet for the frustrations which all thoughtful Americans must feel in the middle of this frightening world. Not through the field of gardening alone, but through every field of human endeavor, we might go far in forging the ultimate weapon against war—*the Will of Peace.*

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BOOK REVIEWS

THE ART OF DRYING PLANTS AND FLOWERS. Mabel Squires. 258 pages, illustrated, indexed. M. Barrows & Co., New York. 1958. $4.50.

DRIED FLOWERS WITH A FRESH LOOK. Eleanor Reed Bolton. 210 pages, illustrated, indexed. D. Van Nostrand Co., Princeton, N.J. 1958. $6.95

DRAMA WITH DRY MATERIALS. Naida Gilmore Hayes. 43 pages, illustrated (photography by Helen D. Faas). The Hayes Studio, Berkeley, Calif. 1958. $1

Three new books about dried materials have opened for the average reader exciting paths of possibilities. The first of these, THE ART OF DRYING PLANTS AND FLOWERS, by Mabel Squires is a valuable reference book for every homemaker. The author completely covers the techniques and art of handling materials for dried effects. She suggests what plants to use and where to find them. A detailed discussion of methods of drying, preserving, and coloring flowers, grasses, seed pods, and wood with step-by-step instructions, explains for the average person how to obtain finished results with simple materials. The suggested drying agents are all easily obtainable. The chapter on mechanics and containers aids the reader to use the dried materials in a professional manner. Directions are given for making flower prints, plaques, period designs, and holiday decorations. Exceptionally clear illustrations aid in the step-by-step directions for completing these designs.

The second book, DRIED FLOWERS WITH A FRESH LOOK, by Eleanor Reed Bolton, deals at length with the selection and preparation of plant material, and the most suitable drying process for the particular material. Detailed instructions for timing and testing are given. Special attention is directed to preserving the flower form. The chapter dealing with the treatment of foliage and ferns is exceptional. The author's special quality is her capacity for constructive detail. Berries, seed pods, cones, branches, and weathered wood have their unique beauty sealed for long lasting use with her methods. The section on "Artistic Applications" details mechanics to groom and assemble dried treasures for decorative purposes. The chapter containing the alphabet of flowers and foliages with specific directions for drying each plant is outstanding. Twenty-four arrangements are shown in color and twenty-five how-to-do-it photographs in black and white complete this book, commendable for its detailed instructions.

The main point of difference between the two books is in the scope of content. Eleanor Bolton covers minutely drying techniques and gives general instructions for use in decorative compositions, whereas Mabel Squires gives complete instructions for using the plant material to decorate the home. Both author's have a light, easy-to-read style, that would put nature's magic at one's finger tips in dried sculptured form.

The third book, DRAMA WITH DRY MATERIALS, by Naida Gilmore Hayes, is a collection of forty picture plates giving a dramatic lesson in composition with special emphasis on form and texture. The captions give sufficient details for the average person to follow. The author's work has a rare

(Continued on page 78)

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INEZ M. HARING, B.L., M.A.	*Assistant Honorary Curator of Mosses*
JOSEPH F. BURKE	*Honorary Curator of the Diatomaceae*
ETHEL ANSON S. PECKHAM	*Honorary Curator, Iris and Narcissus Collections*
MRS. WILLIAM PHELPS, JR.	*Collaborator in Venezuelan Botany*
EDMUND H. FULLING, PH.D.	*Honorary Curator*

NEWS, NOTES and COMMENTS

Dr. William C. Steere, Director of The New York Botanical Garden, was elected Vice-President of the Torrey Botanical Club, at its annual meeting, held at Hunter College on January 20, 1959.

Dr. William C. Steere, Director of The New York Botanical Garden, has been elected to the Council of the American Association for the Advancement of Science as Committee-man-at-large Section A (which is Botany).

The Garden Appoints Business Manager and Assistant Director. Robert F. Kolkebeck, who has been with the Educational Testing Service, Princeton, New Jersey, for the past ten years, first as chief accountant, then as assistant treasurer and director of general services, has been appointed Business Manager and Assistant Director of The New York Botanical Garden. Charles B. Harding, President of the Garden, made the announcement immediately following an executive committee meeting of the Board of Managers on January 20.

Mr. Kolkebeck's broad experience in financial and administrative matters will prove valuable in assisting the Director, Dr. William C. Steere, in the program of expansion being planned for The New York Botanical Garden. He will assume many of the financial responsibilities previously handled by Henry de la Montagne, who retired in September 1958 after twenty-seven years' service with the Garden, and some of the administrative responsibilities of A. C. Pfander. Mr. Pfander, as Administrator, is liaison officer between The New York Botanical Garden and the Park Department and the Board of Estimate of the City of New York.

Mr. Kolkebeck, who was born and raised in Brooklyn, N. Y., majored in psychology at Harvard College and, after being discharged from military service, received his Master's degree in business administration from the Harvard Business School. Commissioned in 1944, Mr. Kolkebeck served as training officer, commanding officer and staff officer with the India-Burma theater headquarters and was discharged with the rank of captain.

Dr. Bassett Maguire Appointed Head Curator. The Executive Committee of the Board of Managers of The New York Botanical Garden, at its meeting on January 20, 1959, appointed Dr. Maguire, Curator and Coordinator of Tropical Research, to the position of Head Curator. Dr. Maguire was appointed Acting Head Curator last October when Dr. David D. Keck, Assistant Director and Head Curator, requested leave of absence to become program director for systematic biology, National Science Foundation. When Dr. Keck recently decided to remain with the National Science Foundation for another year, he also decided to give up his title of head curator at the Garden, to prevent this important office going for two years on an acting basis.

Seminars Organized at the Garden under the direction of Dr. P. P. Pirone, Plant Pathologist, for staff and students. On January 21, 1959, Dr. G. Erdtman, Director of the Palynological Laboratory, Biomma (Stockholm) Sweden, discussed palynological problems; on January 23, 1959, William T. Stearn of the Department of Botany, British Museum of Natural History, talked about "The British Museum, Chelsea Physic Garden and Royal Botanic Gardens, Kew, Their History and Relations;" on February 19, Miss Carol Woodward, Editor of Outdoor Books of Macmillan Co., told the group "What a Publisher Expects of an Author."

Exchange of Plants Initiated. The gift of a distinctly American shrub, the beach plum, *Prunus maritima,* initiated an exchange of plants between The New York Botanical Garden and the American-patterned Bar-Ilan University in Israel, located at Ramat Gan, a suburb of Tel-Aviv. Dr. William C. Steere, Director, chose the beach plum for its hardiness and because its natural habitat is a sandy soil.

In presenting the plant at the Garden on January 6, 1959, to Solomon J. Weinstein, financier-philanthropist and life-long Zionist, Dr. Steere said: "I hope this plant will thrive in the soil of the Holy Land with the same vigor it has spread in our country. I hope it will become the first of a family of shrubs and grasses to help tame the 175,000 acres of sand dunes which now lie on the soil of Israel like a sterile weight, and will contribute to Israel's mission of converting the desert into a garden."

Dr. Steere accepted the invitation of Rabbi Joseph H. Lookstein, chairman of the University's Academic Council, to the post of honorary chairman of the committee to endow the Solomon J. Weinstein Chair of Botany at Bar-Ilan University. The drive for the endowment fund was launched at a dinner on January 27, 1959, at the Waldorf Astoria, New York, which Dr. and Mrs. Steere attended.

When weather permits, the first of a number of trees, shrubs and other plants, mentioned in Biblical context, will be shipped by Bar-Ilan University to The New York Botanical Garden.

Additions to the Garden's Living Plant Collections. Louis P. Politi, Horticulturist, reports that twenty-six horticultural varieties of *Acer palmatum* and four of *A. japonicum* have been added, as also eleven horticultural varieties of *Prunus serrulata,* to the living plant collections of The New York Botanical Garden. Mr. Politi is also building up a comprehensive collection of rhododendron species, varieties and hybrids. Including young plants and seedlings, the collection comprises five hundred plants. Several new Caroliniana hybrids were received recently from Edmond A. Amateis of Brewster, New York.

Exhibit of Paintings of Puerto Rican Flora by Frances W. Horne will be staged in the Museum and Administration Building of The New York Botanical Garden, starting April 1, 1959. This exhibit is particularly timely, as this year marks Dr. Britton's one hundredth anniversary and the twenty-fifth since his death.

Of the five hundred paintings Mrs. Horne had then completed, four hundred were selected by the late Dr. Nathaniel Lord Britton, first Director of the Garden, to illustrate his proposed work, FLORA OF PUERTO RICO. Dr. Britton's manuscript is in the library of The New York Botanical Garden.

Mrs. Horne's subjects include representatives of the rare and very beautiful endemics of the high mountains; also of lower altitudes, Coastal, on the dry south side; the so-called "desert;" and some of the more common wayside flowers. Since Dr. Britton's death, Mrs. Horne has collected and painted another two hundred, most of which are high mountain species, secured when roads, opened by the Forest Service, made the dense forests accessible.

Her husband, Charles, was a warm friend of Dr. Britton and assisted him in the collecting of many species. Dr. Britton named one of the byrsonemas Mrs. Horne collected —Mrs. Horne's byrsonema, *Byrsonema horneana,* in her honor.

Visitors to the Garden. Sir Oliver and Lady Leese visited the Garden early in January, en route to Oklahoma, Arizona, and California to see cacti and succulent collections. What started out, following World War II, to be an amateur gardener's interest in these plants has now grown into the largest cacti and succulent business in England, if not the world. Under the guidance of T. H. Everett, Curator of Education and of Horticulture at The New York Botanical Garden, Sir Oliver and Lady Leese saw the Garden, Julius Roehr's establishment in Rutherford, New Jersey, and Longwood Gardens in Kennett Square, Pennsylvania.

Other visitors included Dr. Frans A. Stafleu from the University of Utrecht, who consulted with Dr. H. W. Rickett on nomenclatural matters; Dr. Gustaf Erdtman, Director of the Palynological Laboratory in Sweden; William T. Stearn, of the Department of Botany of the British Museum of Natural History, who used the facilities of the Library; Dr. Antonio Ciccarone, Director of Plant Pathology, University of Bari, Italy, who conferred with Dr. Clark Rogerson in the Cryptogamic Herbarium; Dr. Rogers McVaugh, of the University of Michigan's herbarium, who relieved Dr. Rickett of the duties of editor-in-chief of BRITTONIA the first of the year—Dr. Rickett continues as managing editor; Dr. Thomas Morely of the University of Wisconsin, who conferred with Dr. Arthur Cronquist and also with Dr. John Wurdack; Dr. Richard Evans Schultes and other staff members of the Gray Herbarium, Harvard University, who consulted with Dr. Bassett Maguire.

Dr. Bassett Maguire, Acting Head Curator and Curator and Coordinator of Tropical Research of The New York Botanical Garden, attended a party in honor of visiting Russian scientists—heads of universities—on December 13, 1958. These scientists had visited scientific institutions throughout the United States, accompanied by an interpreter of the U. S. State Department. Dr. Lebedev, Rector of Odessa University, a plant physiologist, and Dr. Dahvmyan, Rector of a university in Armenia, an agronomist, paid a visit to The New York Botanical Garden on December 14.

Dr. David D. Keck, on leave to serve as program director for systematic biology, National Science Foundation, spent a day at the Garden, to confer with the Director, Dr. William C. Steere, and the staff members. Dr. Keck reported to the staff conference on January 13, which Charles B. Harding, President of The New York Botanical Garden attended, the responsibilities and endeavors of the National Science Foundation, particularly in the field of botany.

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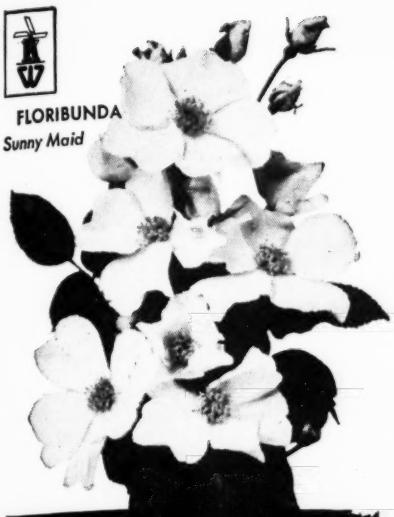
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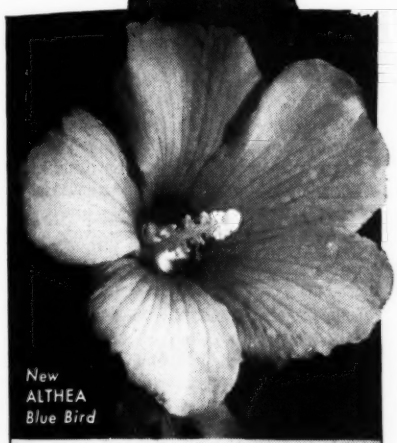
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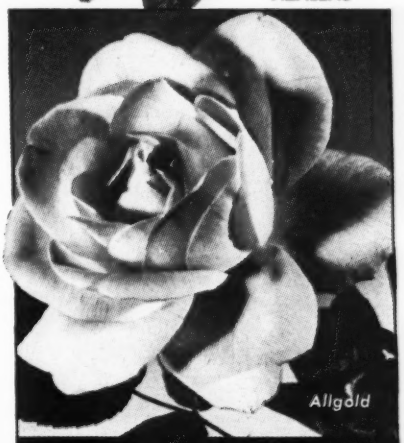
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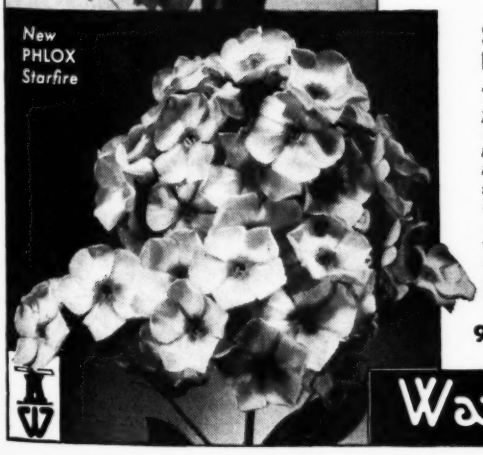
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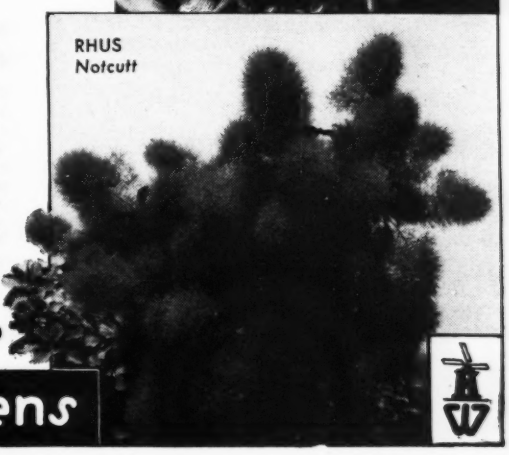
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The American Association for the Advancement of Science meeting in Washington, D. C., in December 1958, was primarily for zoologists. However, a number of botanists attended and participated in the symposiums. Dr. H. W. Rickett, Acting Assistant Director and Bibliographer of The New York Botanical Garden, took part in the three-day program, December 28-30, which had been prepared by the Society of Systematic Zoologists to commemorate the publication of SYSTEMA NATURAE in 1758. William T. Stearn, of the Department of Botany, British Museum of Natural History, gave a very stimulating lecture on Linnaeus and his theories. Dr. David D. Keck, Assistant Director of the Garden, on leave to serve as program director of systematic botany, National Science Foundation, participated in the symposium on the present trends and the future prospects of taxonomy, zoology, and botany.

United Nations Gardens, located on the north side of the General Assembly Building, between the United Nations Plaza on First Avenue and the Franklin D. Roosevelt Drive, and extending three blocks to East 48th Street, are now open daily, 9:30 A.M.-6:00 P.M., to the public and also on Saturday and Sundays.

Dr. P. P. Pirone, Plant Pathologist of The New York Botanical Garden, is consultant to the United Nations Gardens: Abraham Fallon, of Westbury, Long Island, is chief gardener.

Horticultural Society of New York honored Robert Moses, Longwood Gardens, and Rockefeller Center at the Society's annual meeting on January 21, 1959, in the presence of some four hundred members.

Dr. Albert J. Irving, Chairman of the Awards Committee, presented three new special awards to: Robert Moses, "honored as an individual for outstanding accomplishment in public display;" to Longwood Gardens "cited as an organization with outstanding contributions in extending horticultural interest and education," and to Rockefeller Center "cited as a corporation maintaining an outstanding and continuous outdoor horticultural display."

Among the twenty-one annual trophies and awards to exhibitors at the Society's monthly shows was the Thomas C. Desmond Trophy for amateur educational exhibits, which was presented to Miss Evelyn Collins Hill of Lynnhaven, Virginia. Mr. Desmond is a member of the Board of Managers of The New York Botanical Garden.

Fourth Annual Connecticut Daffodil Show of the American Daffodil Society will be held in Old Greenwich, Conn., April 28 and 29, 1959. Presenting the show is The Garden Club of Old Greenwich assisted by the Mianus River Garden Club, and eight Garden clubs in Greenwich cooperating. Chairman of the Show is Mrs. Basil W. Matthews, and co-chairman, Mrs. Frederick M. Jackson, both of The Garden Club of Old Greenwich.

All horticultural divisions are open to the public, and five arrangement classes will be featured, by invitation only, each titled with a poetic theme. Entry registrations are being accepted by Mrs. John H. Pinto, Stoney Ridge Lane, Riverside, Conn.

"Herbicides and the American Farmer" is the title of the paper presented by R. H. Beatty, agricultural chemical Research Director for Amchem Products, Inc., formerly

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American Chemical Paint Co., before the fifth British Weed Control Conference held at Brighton, England, during November 1958. Mr. Beatty, past president of the Weed Society of America and the Northeastern Weed Control Conference, discussed some of the newest developments in American chemical weed control and current procedures in the use of herbicides with vegetable crops. American farmers, it is interesting to note, spray more acres for weed control than for the control of insects and diseases combined.

New Burpee Seeds. David Burpee, President of W. Atlee Burpee Co., of Philadelphia, Pennsylvania, traces the history of the "Sentinel" snapdragons, which his company is introducing this year, to emphasize the point that "new flowers just don't happen." The old "German Maximum" snapdragons were the biggest and the most vigorous in the fields of Floradale Farms, in California, some eighteen years ago. Also on trial there at the same time was a variety known as 'En Garde.' It was the half-dwarf type used for bedding in Europe but not popular in this country, and its flowers were a dull muddy pink. A mutant of 'En Garde' appeared which W. Atlee Burpee Co. named 'Pink En Garde,' but did not introduce because of the half-dwarf habit. In June 1940, when Mr. Burpee was at Floradale Farms, he told one of the pollinators to cross the "German Maximum" snapdragons with 'Pink En Garde'. After years of selecting progeny from this 1940 cross to obtain favorable characteristics, the new "Sentinel" snapdragons are now available.

W. Atlee Burpee Co. also announces that its "Curlilocks" asters, a new development, are "extra good"; and that its "Galaxy" sweet peas made quite a hit in England, winning for two years the highest awards given by the National Sweet Pea Society and the Royal Horticultural Society in their sweet pea trials. The "Galaxy" sweet peas under favorable cool conditions produce as many as ten or eleven flowers, well placed, on a long, strong stem; here in the East, with hotter summers, Mr. Burpee says five to seven flowers per stem may be expected.

American Rose Society now has James P. Gurney as the editor of its publications. Mr. Gurney, who is the executive secretary of the Society, succeeds Frank H. Abrahamson in the post which he resigned to join the staff of the GARDEN SUPPLY MERCHANDISER magazine. Margaret E. Coon, advertising manager of the AMERICAN ROSE MAGAZINE, will become managing editor of the magazine and the AMERICAN ROSE ANNUAL.

Miss Mabel Choate of New York City and Stockbridge, Massachusetts, died on December 11, 1958. Miss Choate had been a member of the corporation of The New York Botanical Garden since 1933, of the Garden since 1918 and a patron since 1951, and of the Advisory Council from 1933-1935, re-elected in 1941 and a member since that date. Miss Choate was especially interested in the Library and Research-Laboratory and generously contributed to the support of the Garden.

Clarence McK. Lewis, of New York City, died from a heart ailment on January 3, 1959, at the age of eighty-two. Mr. Lewis, who had been an investment banker with William Salomon & Co., and Blair & Co., retiring in 1932, was one of America's outstanding horticulturists and had been a devoted member of the Board of Managers of The New York Botanical Garden for many years. He served on the Executive Committee since 1931 and as chairman of Scientific Committee from 1939-1956. He took a special interest in the Library and School for Gardeners; his address to the graduating class in June 1937 was memorable. Mr. Lewis became a member of the Board of Managers in 1930, of the Corporation of The New York Botanical Garden in 1929, a life member of the Garden in 1930, and a patron in 1945.

In 1953, Mr. Lewis presented the Library of The New York Botanical Garden with 1,177 bound and 439 unbound volumes, over 1,000 separate numbers and parts of periodicals, over 1,000 reprints and bulletins, over 2,000 clippings, tear sheets and photographs. This acquisition, valued at more than six thousand dollars, was "particularly valuable because of the supplementary material" and because it reflected Mr. Lewis's "many-sided interests and careful selection of letters."

He endowed a room in the Research-Laboratory Building and otherwise generously contributed to the Garden.

In 1918, perhaps even before that year, Mr. Lewis began planning for the beautiful gardens to which he aspired. He was then living in Mahwah, New Jersey, in an attractive country place nestled in the foothills of the Ramapo Mountains. He acquired the extensive property of the late Francis Lynde Stetson, some three thousand acres—later selling the more mountainous section and reducing the acreage to one thousand or so. The building of the mansion and the development of the property were begun in 1922; the estate was ready for occupancy in 1927.

Skyland Farms, Sterlington, New York, became renown for its magnificent gardens —rose garden, rock and wall gardens, wild garden, and perennial borders of the proportions found on English estates—and its notable collections of trees and shrubs. It was the "Mecca" of horticulturists from abroad as well as in this country. The Horticultural Society of New York visited it; the American Rock Garden Society held several of its annual meetings there. Mr. Lewis was a charter member of the latter, served on its Board of Directors, and regularly attended the monthly meetings of the North Atlantic Region.

In 1953 Mr. Lewis transferred the ownership of Skylands Farms to Shelton College. To mark the episode, a group of "appreciative garden enthusiasts familiar with Skylands and cognizant of the great contribution Mr. Lewis has made to horticulture," visited the estate on the afternoon of May 30, 1953, and tendered him a dinner that evening at the Swiss Chalet in Ramsey.

Mr. Lewis, who was born in New York City on October 26, 1876, was graduated from Columbia University with a degree in civil engineering in 1898, and served for a time as assistant chief engineer of the Baltimore and Ohio Railroads.

He is survived by a son, C. McKenzie Lewis, Jr., of Pittsburgh, and a daughter, Mrs. Hans Zinsser of New York City, four grandsons and a granddaughter.

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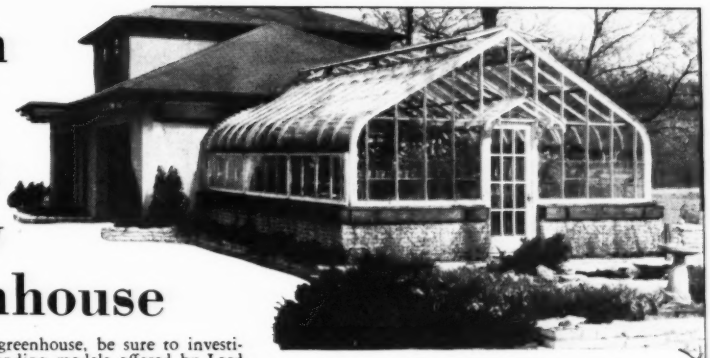

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Scardsdale, N. Y.

THE COMPLETE GUIDE TO INDOOR PLANTS. Eigil Kiaer. 186 pages, illustrated, (illustrations in color by Ellen Backe), indexed. Crown Publishers, New York. 1958. (Printed in Denmark.) $3.50

This is definitely a pretty and handy little book for the lover of house plants. Inside its red cloth cover, one hundred twenty-eight of its one hundred eighty-six pages are packed with colorful prints of watercolor drawings of three hundred seventy-two better-known indoor plants, showing their most eye-catching parts, flowers or attractive foliage. The illustrations are in alphabetical order, which makes them easy to locate but brings together some strange bedfellows. The botanical names are mostly quite correct but lean toward the European concept, which uses *Billbergia forgetiana,* for our *Aechmea caudata variegata, Zygocactus* for our *Schlumbergera;* likewise, where horticultural hybrids are shown, these are apt to be those of the European trade. However, it is a practical quick-reference book, which will focus the attention of many an average home gardener or apartment dweller on a wide variety of interesting plants, and usually readily available, too. Once he has them in the home or greenhouse, a compact text will give good guidance on their habits and suggested care.

A. B. GRAF
Julius Roehrs Co.
Rutherford, N. J.

THE AUDUBON BOOK OF TRUE NATURE STORIES. Selected and edited by John K. Terres. 294 pages, illustrated by Walter W. Ferguson. Thomas Y. Crowell Co., New York. 1958. $5

The people who, over the years, have written articles for the AUDUBON MAGAZINE are sometimes professional naturalists but more often they are simply people who have animal friends and want to tell about them. These bird-feeder-and-backyard naturalists are seldom professional writers, either, but one and all they have the precious gift of intense and affectionate observation and often a homely directness of statement that allows us to share a deeply-felt experience as through a letter from an old friend.

Mr. Terres, who is editor of the AUDUBON MAGAZINE, has selected forty-eight stories, or articles, that are described as "some of the best-loved" contributions to the magazine. It is a generous and varied selection, and it ranges from a very professionally written essay on "The World of a Chipmunk" by Alan Devoe to the charmingly relaxed and tolerant "Cottontails in My Garden" by Frank F. Gander, whose plea for rabbits ("Cottontails, I believe, would make themselves at home in anyone's garden") is not likely to get a big vote in any garden club meeting.

The variety of wild creatures that can be induced to tolerate the close approach of human beings, if the human beings bring patience and quietness and gentleness—and food—to the experience, is almost limitless. Perhaps it is limitless, although superhuman patience might sometimes be required. The stories in this book concern such a diversity of creatures as a cougar, a whooping crane, a white-tailed deer, a brown thrasher, weasels, a grackle, a screech owl, tree swallows, kangaroo rats, black-tailed jack rabbit, a sooty tern, a bassariscus, a coyote, pack rats, porcupines, red squirrels and a golden eagle, with all of which human beings had more or less close relations. That list, selected at random, is by no means complete.

Mr. Ferguson's many drawings are sheer delight, whether delicate or bold, and they are beautifully reproduced.

WILLIAM BRIDGES
Curator of Publications
New York Zoological Society

WINDOW SILL GARDENING. James Underwood Crockett. 120 pages, illustrated, indexed. Doubleday & Co., Garden City, N. Y. 1958. $2.95

Evidently written for the very beginner who has no wish to go deeply into the subject, this book has its merits. It is entertainingly written and the information given is accurate. Sometimes one wishes that the information would go a bit further. This reviewer wondered why in a limited text, the cyclamen and the azalea are treated so prominently. Neither is an easy house plant. Some of the easiest, such as sansevieria and aglaonema, are not mentioned. No classification of house plants according to their tolerance of dry heat and poor light—most needed by the beginner—is included.

H. TEUSCHER, *Curator*
Montreal Botanical Garden

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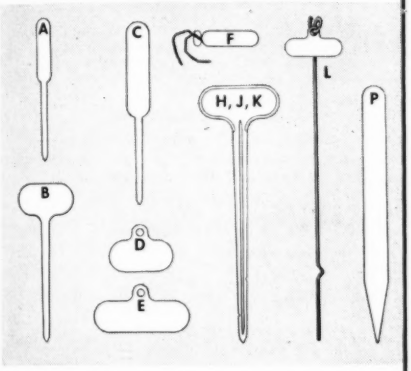

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FLOWERING PLANTS FROM CUBAN GARDENS by The Garden Section of the Woman's Club of Havana. 364 pages, illustrated, indexed. Criterion Books, New York. 1958. $6.95

FLOWERING PLANTS FROM CUBAN GARDENS might well be titled "Flowering Plants of the Caribbean" or, perhaps "Tropical Home Owners' Garden Book," so comprehensive is its coverage. Not only is this excellent work useful to gardeners who live on "Pearl of the Antilles," but it will be equally serviceable to gardeners on all of the islands of the inland sea and to those who live on its mainland shores to north, south and west.

Recently published in an enlarged, second edition by Criterion Books of New York, FLOWERING PLANTS FROM CUBAN GARDENS presents authentic text and accurate drawings, so that every user—home owner, tourist or greenhouse gardener in the north—can identify and quickly learn about the characteristics and cultural requirements of the plants he sees before him.

The handsome appearance of this 365-page book, its good typography and imaginative format add to its appeal. Each left-hand page (even-numbered) is devoted to English text with Spanish translation below, then, just opposite (unnumbered) is a full-page line drawing adequately captioned with Latin binomial, Spanish and English common names, family and place of nativity. New full-color illustrations, flowering charts and bibliography add to the usefulness of this accurate, lucid, readable garden book.

FLOWERING PLANTS FROM CUBAN GARDENS refutes the oft-held notion that committee work seldom comes to fruition. Here, a group of working gardeners in The Woman's Club of Havana pooled their experiences in tropical gardening together with their considerable talents in graphic and verbal expression to produce a book to which all gardeners between Cancer and Capricorn may refer with confidence.

JOHN V. WATKINS, *Professor*
University of Florida

WILDLIFE OF THE INTERMOUNTAIN WEST. Vinson Brown, Charles Yocom, Aldene Starbuck. 141 pages, illustrated, indexed. Nature-graph Co., San Martin, Calif. 1958. 2.50

This is a popular handbook illustrating and briefly describing some of the commoner species of seed plants and vertebrates in the region covered. After a brief introduction and illustrated glossary, ten different habitats are discussed. The common plants in each habitat are treated, and the vertebrates merely listed. All the vertebrates are then treated separately in taxonomic sequence. The illustrations are attractive and well reproduced, but a spruce-fir *(Picea-Abies)* forest is mislabeled Douglas-fir (*Pseudotsuga*). The book should be interesting to casual observers who do not wish to take the trouble to get separate, more detailed books on the plants and various groups of animals.

ARTHUR CRONQUIST

ADVANCES IN GENETICS. VOLUME IX. Edited by M. Demerec. 294 pages, indexed. Academic Press, New York. 1958. $8.80

The current volume of this useful series contains six reviews. Hampton L. Carson summarizes ten years of work on population genetics of *Drosophila robusta,* presenting the geographical distribution of many cytological and morphological variants, and showing that they occur in clines. The genetics of Basiliomycetes are treated by Haig

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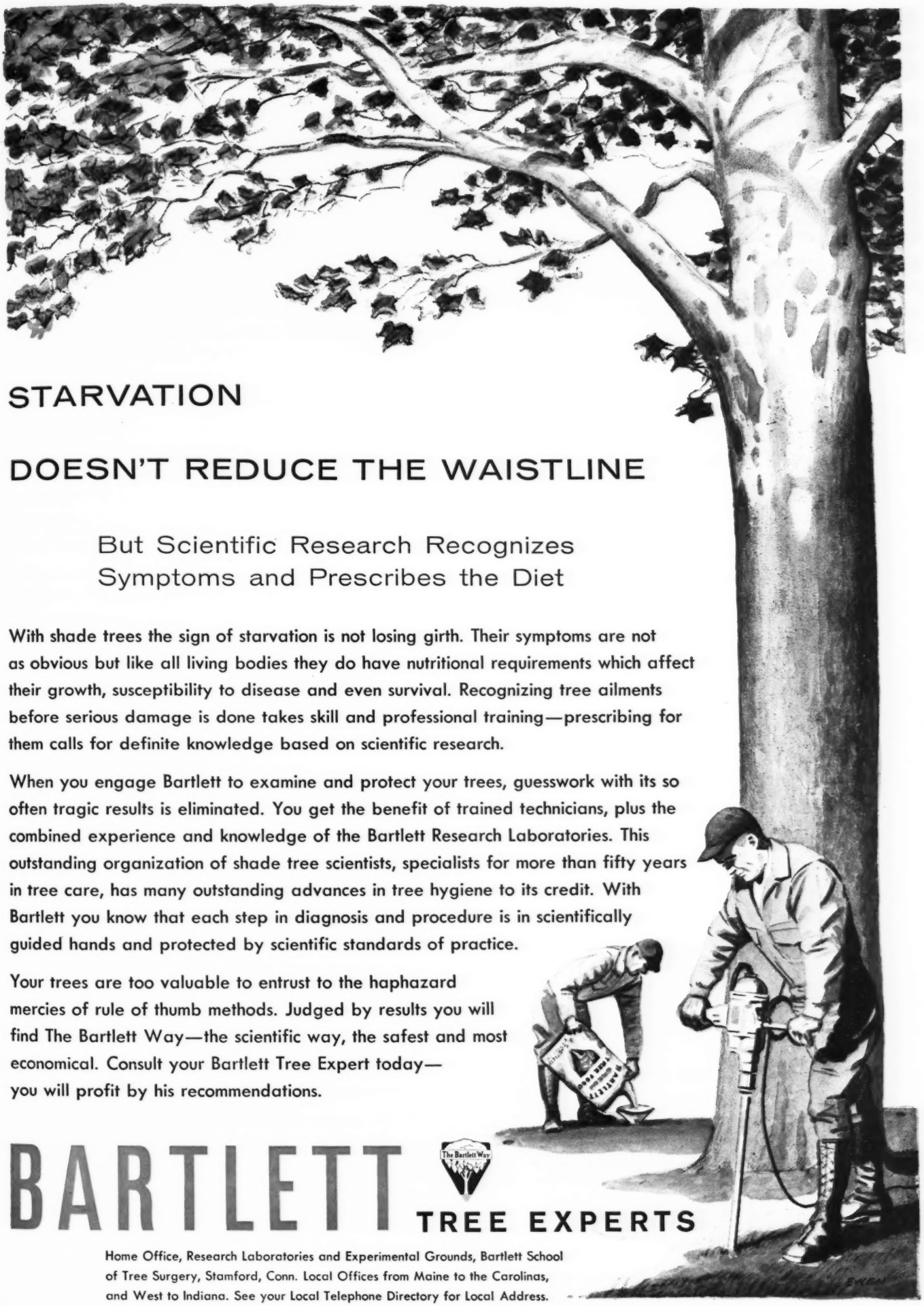
P. Papazian, with a discussion of mating systems and compatibilities, mutation and segregation, transfer of nuclei to foreign cytoplasm, and nucleocytoplasmic relations. Pontecorvo and Käfer write on somatic reduction of "haploidization" and mitotic crossing-over in *Aspergillus nidulans*. They use these phenomena to make genetic analyses of chromosomes in a species in which, for lack of known sexuality, the usual method through meiosis is impossible. Etta Käfer (now Boothroyd) follows with a paper on mapping eight chromosomes of the same species. (One may perhaps venture to wonder how, if mitotic crossing-over is as common as these authors think, even in higher plants, it is possible to relate the facts of breeding with the cytology of meiosis without substantial corrections.) G. Ledyard Stebbins contributes a chapter on hybrid invariability, weakness, and sterility. The first two are due to incompatibility of parental chromosomes, of cytoplasms, or of embryo with surrounding tissues. Sterility may be evident either in diploid or in haploid cells. Breakdown of hybrids in subsequent generations is also discussed. Stebbins concludes that these isolating phenomena, so important in speciation, have had different origins in different groups, and that future study of evolution must treat each group in this light. M. Westergaard closes the volume with an analysis of sex determination in dioecious flowering plants, treating the genetics and the origin of dioecism, cytoplasmic factors, and polyploidy. He arrives at three types of sex determination, forming a series from bisexual ancestors to fixed dioecism.

H. W. RICKETT

AMONG OUR CONTRIBUTORS

(from inside front cover)

only for its begonia collection, but also for its collections of pelargoniums, ivies, peperomias, herbs and other plants. Although begonias were her first love and she has made quite a study of them, Mrs. Ross has developed during the last fifteen years a deep interest in pelargoniums. She helped to get the International Pelargonium Society, which now boasts some fifteen hundred members, organized. . . . Dr. Edward O. Gangstad is Agronomist at the Texas Research Foundation, Renner. . . . A New Englander by birth and a graduate of the University of Massachusetts with a Master's degree in landscape architecture, Albert S. Beecher has been associate horticulturist at Virginia Polytechnic Institute, Blacksburg, since 1948. His duties are divided between teaching horticulture at the college and extension work in horticulture and landscape design. Mr. Beecher also finds time to serve as editor of the Virginia Nurserymen's Newsletter, as instructor of the National Council of State Garden Clubs, Inc., and as director of the Virginia Federation of Garden Clubs' flower show. . . . Fred J. Nisbet was about thirteen years old when he heard a lecture by a landscape architect that made him break the family tradition that all boys became engineers and earn his B.S. in landscape architecture at the University of Massachusetts. After World War II, he spent three years at Cornell University teaching and working for a PhD.; this was followed by three years of teaching plant design and plant materials at West Virginia University and almost four years as editor of the publications of the American Rose Society. It will be three years this August that Dr. Nisbet became Superintendent of Biltmore Estate. . . . T. H. Everett is Curator of Education and of Horticulture at The New York Botanical Garden. . . . Walter Singer is Foreman of the Conservatory of The New York Botanical Garden. . . . Gertrude B. Foster is Editor of Herb Grower Magazine. . . . J. C. McDaniel is assistant professor of horticulure at the University of Illinois, Urbana, and vice-president of the Northern Nut Growers' Association which, incidentally, was organized in a meeting November 17, 1910 at The New York Botanical Garden; its fiftieth annual meeting will be held August 17-19, 1959, at Illinois College, Jacksonville, Illinois.



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